JANUARY, 1942

Rock Products

THE INDUSTRY'S RECOGNIZED AUTHORITY

ANNUAL PICTORIAL REVIEW NUMBER

FOR VICTORY

BUY
UNITED
STATES
SAVINGS
BONDS
AND STAMPS

ON SALE AT YOUR POST OFFICE OR BANK

LUDLOW-SAYLOR

CONTROLLED-TEMPER SUPER-LOY WOVEN WIRE SCREENS

for super-severe service

●

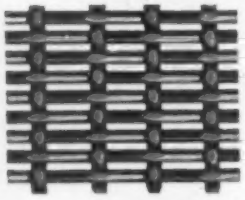
SUPER-HARD, SUPER-TOUGH, SUPER-STRONG

CONTROLLED-TEMPER SUPER-LOY WOVEN WIRE SCREENS

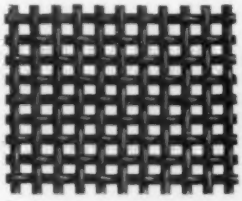
withstand abrasion longer —

endure vibration better —

resist fatigue to the utmost



REK-TANG
long-slot
weave



DOUBLE-CRIMP
square-mesh
weave

The background at top of page shows the "Perfect" Double-Crimp Weave.

The small cuts in the center panel compare REK-TANG Weave and Double-Crimp Weave.

The border at foot of page shows "Perfect" Double-Crimp Steel Wire Cloth which has been hot-dip galvanized after weaving.

Samples on request.

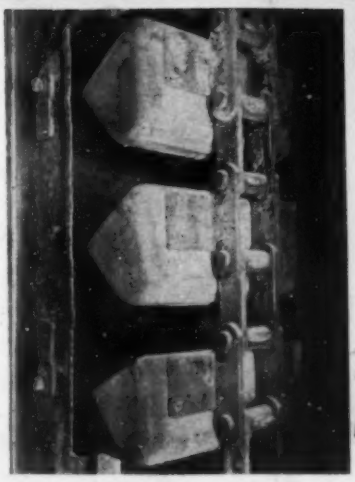
The LUDLOW-SAYLOR WIRE COMPANY
SAINT LOUIS

TN950
.A3
20634
246
D
GK 2804.44
76

Increase Production .. Promote Efficiency with LINK-BELT EQUIPMENT

BUCKET ELEVATORS

After 15 years of service and handling over 10,000,000 tons of raw material at an eastern cement mill, this bucket elevator, using SS-856 chain, is doing an outstanding job. On other applications, SS-856 chain is used for handling hot and cold clinker, crushed stone, sand, and other materials.

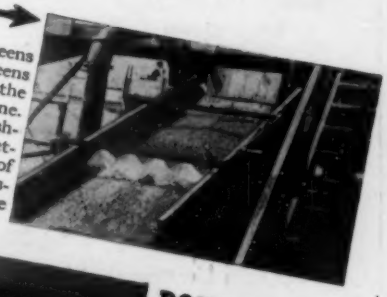


APRON FEEDERS

This heavy-duty manganese steel combined sorting table and ore-feeder conveyor travels at a speed of 8-ft. per minute, is driven by a 10 H.P. motor, and has thus far given more than 9 years' service, handling over 5,000,000 tons of rock and ore.

SCREENING

Supplement your rotary screens with Link-Belt vibrating screens to obtain a better grading of the smaller sizes of gravel or stone. Rotary screens for better washing—vibrating screens for better sizing. The combination of both rotary and vibrating assures your ability to meet the most rigid specifications.



BELT CONVEYORS

This Link-Belt anti-friction belt conveyor is part of a three-belt conveyor system handling up to 2,000 tons of crushed limestone and cement rock per day. Originally installed for 180 tons per hour, it is now handling 260 tons per hour. Approximately 1,000,000 tons have been handled in three years without requiring any repairs or replacements of conveyor parts.

- Link-Belt conveyors and driving machinery are enabling many plants to increase output with minimum effort. Put your problem up to experienced Link-Belt engineers.

LINK-BELT COMPANY 96304

Engineers and Manufacturers of Materials Handling and Mechanical Power Transmission Machinery Since 1875
Chicago, Indianapolis, Philadelphia, Atlanta, Dallas, San Francisco, Toronto. Offices, warehouses, and distributors located in principal cities. Link-Belt Speeder Corp., Chicago and Cedar Rapids.

POSITIVE DRIVES

Kiln drive arrangement was modernized with this Link-Belt triple-reduction herringbone gear reducer, double strand Silverlink roller chain drive, "RC" flexible coupling and Friction Fighter roller bearing pillow block, replacing other forms of drives, at a western brick manufacturing plant. This drive not only reduced power requirement from 20 to 5 H.P., but also eliminated frequent maintenance and repairs, making it an ideal drive for the service.

LINK-BELT CONVEYORS and DRIVES

LINK-BELT

EQUIPMENT INCLUDES: Complete Sand, Gravel and Stone Crushing, Screening, Washing, Storing and Reclaiming Plants . . Ready-Mixed Concrete Plant Equipment . . Lime Handling Equipment . . Screens (vibrating, rotary and conical) . . Washers and Classifiers of the screw, log, flight, Shaw and conical types . . Dewatering Rotoscoops and Screw conveyors . . All Types of Elevators and Conveyors . . Roto-Louvre Dryers and Coolers . . Skip Hoists . . Car Spotters and Haulage Systems . . Portable Conveyors and Bucket Loaders . . Silent and Roller Chain Drives . . Speed Reducers . . Variable Speed Transmissions . . Chains (Malleable Iron, Promal and Steel) . . Sprockets . . Gears . . Clutches . . Couplings . . Base Plates . . Friction Fighter Self-Aligning Ball and Roller Bearing Units . . Babbitted and Bronze-Bushed Bearing Units . . Catalogs on request.

JAN 27 1942

Rock Products

Recognized the World Over as the Leader in Its Field

With which have been consolidated the journals *Cement and Engineering News* (founded 1896) and *Concrete Products* (established 1918)

VOL. 45, No. 1, JANUARY, 1942

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ROCK PRODUCTS Bears the Twin Hall-Marks of Known Value.

Audit Bureau of Circulations — Impartial measurement of reader interest in terms of paid circulation.

★

ABP — Authentic facts relating to editorial scope and readership analysis.

(PUBLISHED MONTHLY AT CHICAGO, ILL., U. S. A.)

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IN QUARRY HAULAGE:

What you don't know ~~won't~~ will hurt you

Above: EASTON TR-15H Semi-Trailer. Average payload 22-25 tons. Hydraulic body hoist optional. Two other sizes.

You're risking big money when you don't know where the pennies go . . .

Today's basic industrial aim is to equip, maintain, and move our fighting forces. Rock products industries rate highly in many phases of our complex war scheme. But in some cases we must be ready to accept weeks or months of waiting for new operating equipment.

We can help all-'round by planning far ahead for the procurement of essential new equipment, and by taking steps immediately to avoid waste of manpower, money or materials.

Today, more than ever, it is important to know where the pennies go . . .

How Easton Can Help You

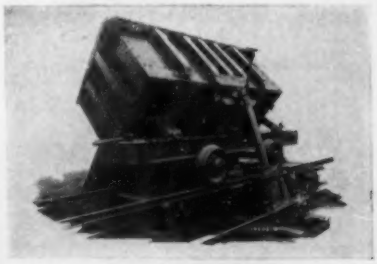
An Easton Survey will provide you with an accurately scaled map of your quarry, including haulage routes, location of shovels, crusher, etc. With this map will be a tabular analysis of routes, equipment and capacity; a detailed time-and-cost study; and a summary of investments and depreciating periods based upon the most practical type of haulage for your service. These facts will help you to plan ahead for new equipment.

At the same time, this survey made by experienced quarry haulage experts, may point the way to immediate speed-ups and short-cuts with your present equipment. In some cases repairs might be made to put old equipment back into practical service.

An Easton Survey will incur no obligation on your part. For information write to Easton Engineering Counsel.

The famous EASTON Phoenix Quarry Car. Doorless. 2-way dump. Timken bearings.

Above: EASTON Won Way Car. Below: EASTON Cornwall Car. Both have automatic down-folding door, Timken bearings.



EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.

EASTON

TWENTY-FIVE YEARS OF SERVICE TO THE QUARRY INDUSTRY

Page *Automatic* Buckets are on the Frontline

AS ALL AMERICA DIGS IN!

The American Excavation Industry is gallantly accepting today's challenge. The call is for S-P-E-E-D in production, all along the line.

On such essential projects as Island Bases, Cantonment Construction, Air Fields, etc., Page AUTOMATIC Dragline Buckets are living up to their reputation for faster digging and increased production . . . they're "doing their bit" with a vengeance!

Extra heavy demands are being made on all equipment manufacturers. We at the Page Engineering Company are sparing no effort to keep abreast of the requirements of the Industry.

May we ask your cooperation "for the duration" by, so far as possible, anticipating your needs for parts and new buckets. Please ORDER IN ADVANCE OF NEED, so that we may serve you better!

PAGE ENGINEERING COMPANY, CHICAGO, ILLINOIS

PAGE *Automatic* DRAGLINE BUCKETS

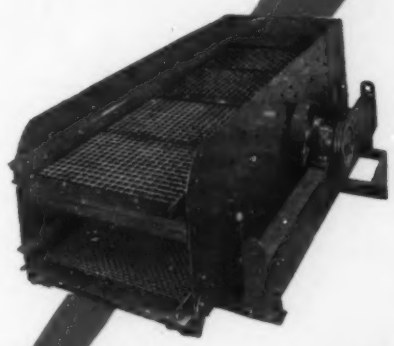
★ ★ ★ BOOST PRODUCTION ★ KEEP AMERICA STRONG ★

Clear for Action

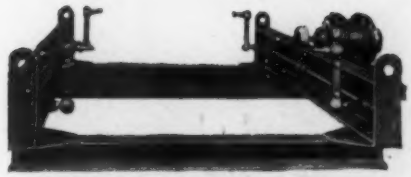
SECO Vibrating SCREENS

There is available for use on the SECO a simple, inexpensive but highly efficient attachment that will prevent moist or sticky material from adhering to the strands of fine mesh wire cloth.

If you have difficulty with this sort of blinding, we invite your inquiry. This patented attachment will go a long way toward overcoming your trouble, and there will be no need to by-pass fine material in wet weather.



The SECO booth will be "home port" for screen operators at the Sand and Gravel and Crushed Stone Conventions.



The SECO Equalizer Assembly gives a positive, controlled and sharp vibrating motion—keeping the entire screening surface on the same plane and eliminating all dead areas.

The deck of a SECO Screen is always in "fighting trim"—meshes clear and ready—whether it's handling difficult aggregate or just waiting for the next round.

The patented SECO CONTROL feature means greater capacity and less blinding in the operating cycle—with a larger return for the producer.

Catalogue on Request

SCREEN EQUIPMENT CO., INC.
9 LAFAYETTE AVE. BUFFALO, N.Y.

Timken Bits will increase your production, speed up Victory, and later on, help you meet the competitive conditions of a post-war world.

A keen appreciation of *time* is the big reason why you contractors were quick to adopt Timken Bits soon after they were introduced 10 years ago. With the United States definitely in the war, time on projects vital to victory is more important than ever. Many of these projects involve rock removal. Therefore, the ability of Timken Bits to drill far faster becomes likewise more important than ever.

But look ahead to post-war conditions. Then one eye will have to be watching the calendar as always, and the other cocked to competition and costs. Hundreds of contractors have testified that the Timken Bit cuts drilling costs to the bone.

Adopt Timken Bits now. The advantage is a double-barrelled one. Write for particulars.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

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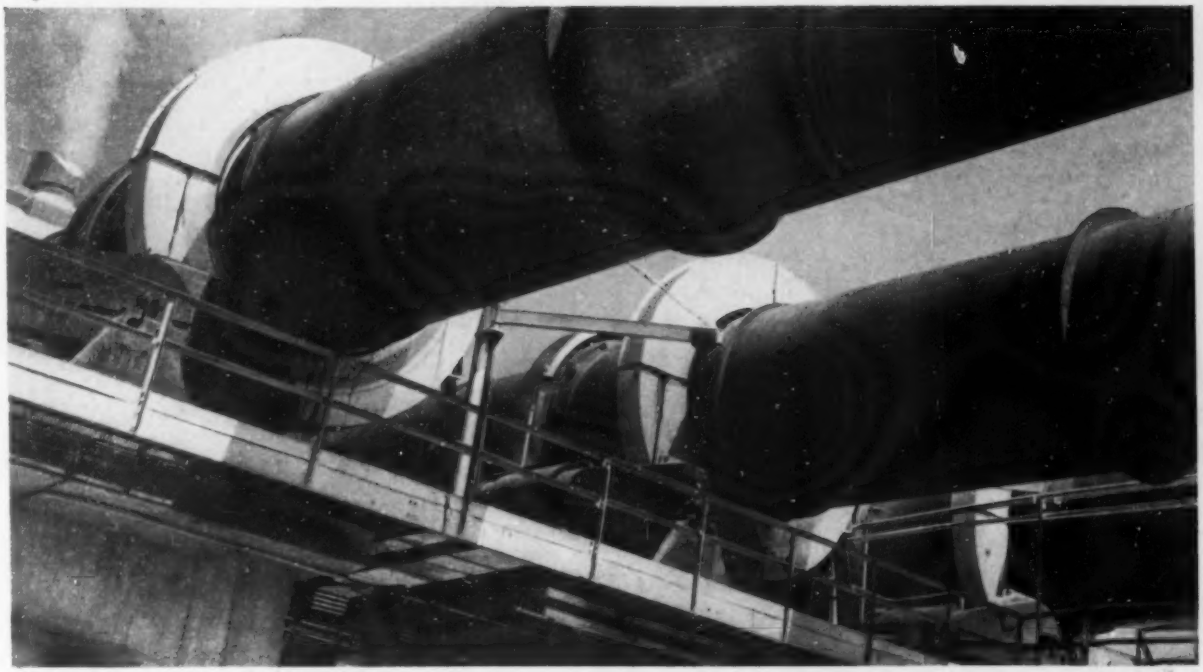
TRADE-MARK REG. U. S. PAT. OFF.

ROCK BITS

TRAYLOR

KILNS ★ COOLERS ★ DRYERS



WE BUILD

Rotary Kilns
Rotary Coolers
Rotary Dryers
Rotary Slakers
Scrubbers
Evaporators
Jaw Crushers
Gyratory Crushers
Reduction Crushers
Crushing Rolls
Grinding Mills
Ball Mills
Rod Mills
Tube Mills
Pug Mills
Wash Mills
Feeders
Rotary Screens
Elevators

The photograph shows three of a large battery of Traylor Rotary Kilns at the plant of one of America's greatest process plants, an installation that is slated to be considerably increased shortly. And each kiln has its companion of a large Traylor Rotary Cooler. This battery represents THREE REPEAT ORDERS.

Confidence in Traylor has been demonstrated in similar practical manner by many other "greats" in the cement and lime manufacturing industries, and in the chemical and mining fields.

There are many excellent reasons why Traylor Rotary Kilns, Coolers and Dryers are so widely preferred, the principal one being that we make it our business to know our clients' businesses. Therefore we are in the best possible position to solve their problems, and when our engineers promise certain results, the equipment they design fulfills those promises surely and liberally.

Producers who do not know Traylor Rotary Kilns, Coolers and Dryers will do themselves a great favor by investigating these machines closely. Write us, today, making appointment with our representative.

SEE OUR BULLETIN No. 115

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THREE "EXTRA PROTECTION" FEATURES GIVE EVERY TRI CLAD MOTOR GREATER STRENGTH AND LONGER LIFE

1 *Extra Protection* against physical damage

2 *Extra Protection* against electrical breakdown

3 *Extra Protection* against operating wear and tear

ARMORED CONSTRUCTION . . . SMOOTH CONTOURS . . . RIGID ALIGNMENT

Strong, one-piece, cast-iron frame and cast end shields, with upper portion completely enclosed, protect vital motor parts from external blows, falling objects, or dripping liquids. There's less chance of damage in installation, or in operation under "slam-bang" conditions.

"FORMEX" WINDINGS . . . BONDED COIL UNITS

Stator windings of Formex wire give extra protection against moisture oil, abrasion, and heat-shock. New synthetic-resin bonding varnish and Glyptal No. 1201 Red on end-turns add to durability. You can count on uninterrupted performance and long life under strenuous conditions.

NEW BEARING DESIGN . . . ONE-PIECE, DYNAMICALLY BALANCED ROTOR

Sleeve bearings proportioned and grooved for protective lubrication under severe loads. Sleeve and ball bearings enclosed in strong, dust-tight housings. One piece rotor, with fans cast integrally, has new electrical and mechanical features assuring smooth, cool operation and high efficiency.

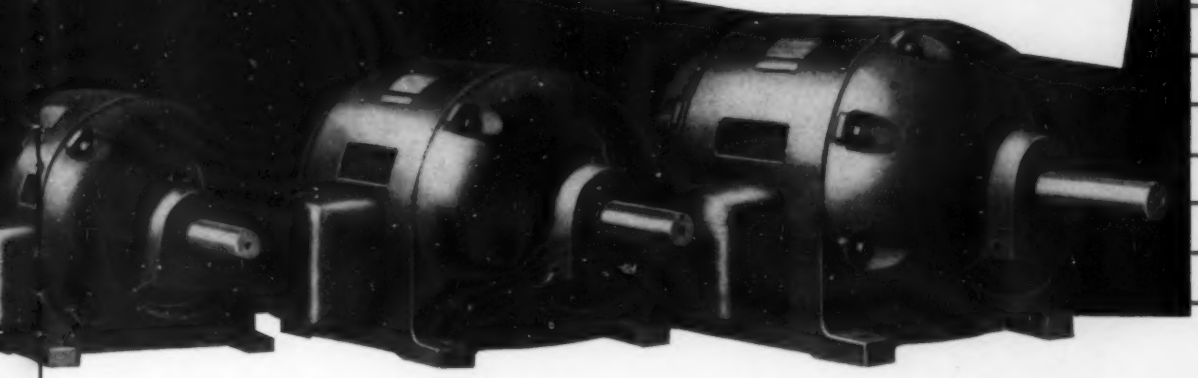
GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y.

BUILT FOR PROTECTION FIRST . . . TO LAST!

up!

NOW . . . . .

TRI CLAD polyphase induction motors are available in integral-hp sizes through . . . . 75 hp



75 hp
60 hp
50 hp
40 hp
30 hp
25 hp
20 hp
15 hp
10 hp
7½ hp
5 hp
3 hp
2 hp
1½ hp
1 hp

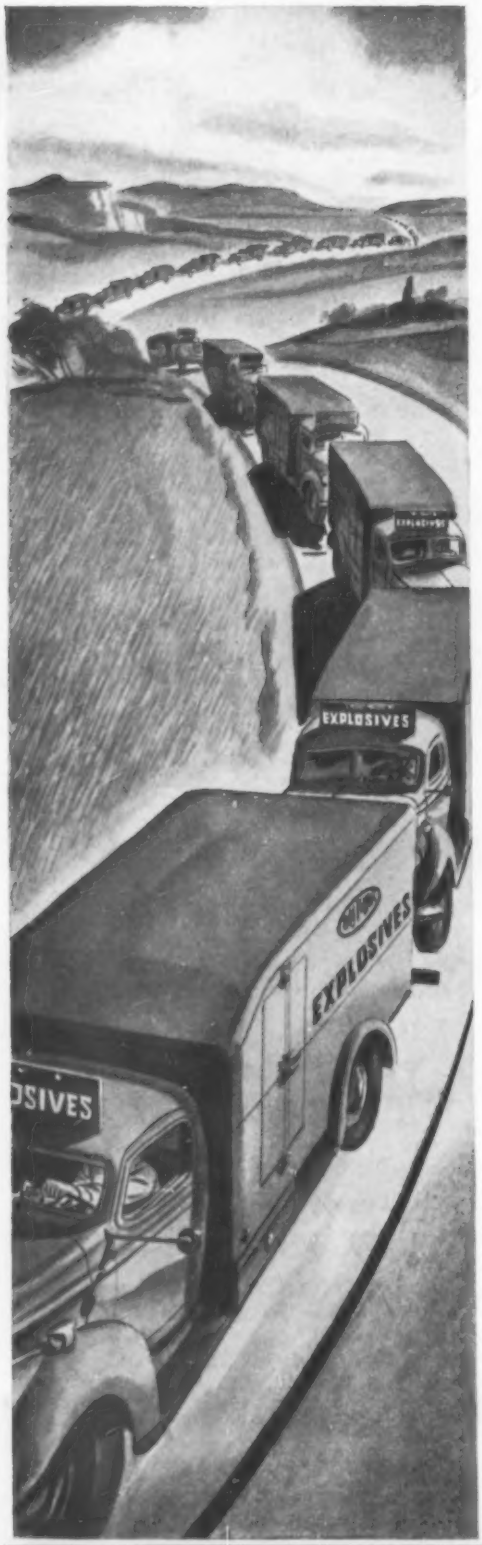
. . . a LARGER range of sizes!

. . . a WIDER scope of service!

The advanced design and triple-tough construction that won industry's enthusiastic acceptance almost overnight have now been extended to many larger motors in our a-c line.

General Electric and its employees are proud of the Navy award of Excellence made to its Erie Works for the manufacture of naval ordnance.

GENERAL ELECTRIC



TO HELP YOU MEET THE NEED FOR STONE *TODAY!*

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

★ **The entire resources of the Explosives Department of this Company are pledged to do the biggest job we know how, in providing explosives for today's huge industrial program. No matter what your problem, there's a Du Pont blasting agent that will bring the stone down right—in minimum time—at the least cost. Our sole aim now, as always, is to place Du Pont explosives at your disposal *when* and *where* you need them.** ★

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

"NITRAMON"*—brings new safety and economy to quarrying. Safer because it cannot be detonated by flame, friction, impact, "Primacord," or the strongest commercial blasting cap. Waterproof because sealed in metal containers. Non-headache-producing. Economical as proved by six years' use under widely varying conditions.

SPECIAL GELATIN—for use wherever water resistance, density, or shattering effect is required in maximum degree. A dense, plastic, waterproof explosive.

"GELEX"* #1 AND #2—semi-gelatin dynamites with characteristics that make it possible to substitute them for the Special Gelatins at a distinct saving, except under unusually severe water conditions. Satisfactory in many cases for both bottom and deck loads.

"RED CROSS EXTRAS"—among the best all-round explosives for quarry use. With their improved water resistance and a loading density almost equivalent to gelatins, these popular grades can also be substituted in many cases for the more costly gelatins. High velocity assures good fragmentation.

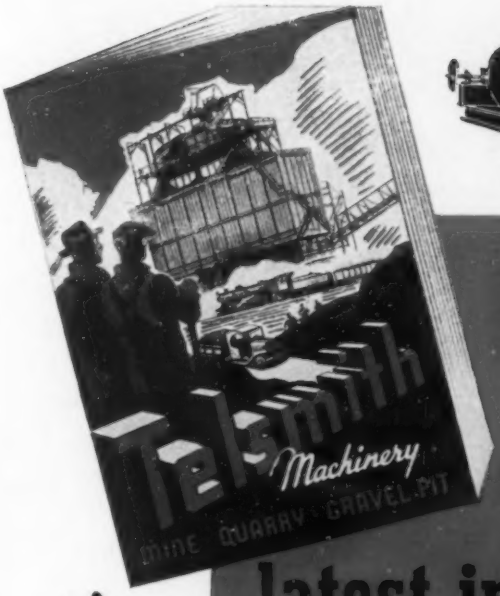
DU PONT "EXTRAS"—efficient, economical explosives where work is not too wet, for top loads in well drill holes and block hole charges in secondary blasting. Available in a high velocity series of eight different strengths and densities and a lower velocity series of five strengths and densities.

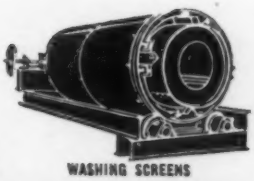
"RED CROSS"* BLASTING F.R. powder—safer and frequently more economical than black powder and approaching it in fragmentation and low velocity. Excellent free-running qualities. Designed for easy loading in sprung holes, holes too ragged for cartridges, and coyote holes.

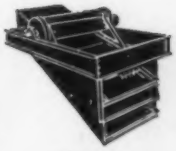
See you at the Stone Show—Du Pont booths 47 and 48, Netherland Plaza, Cincinnati, February 2, 3, & 4.

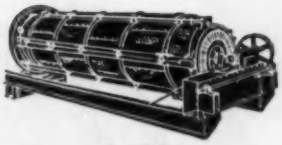
E. I. DU PONT DE NEMOURS & CO. (INC.)
Explosives Department, Wilmington, Delaware

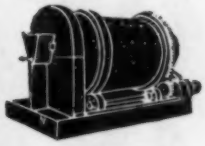
DU PONT **EXPLOSIVES** *and* **BLASTING ACCESSORIES**



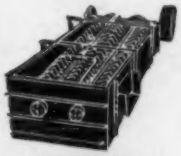

WASHING SCREENS

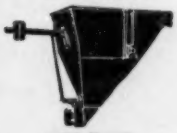

PULSATORS


DRY SCREENS


SUPER SCRUBBERS

SCREW REWASHERS

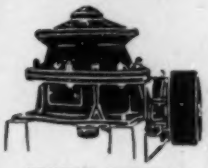

LOG WASHERS


SAND TANKS

SAND DRAGS

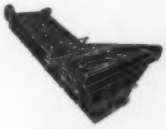
JAW CRUSHERS

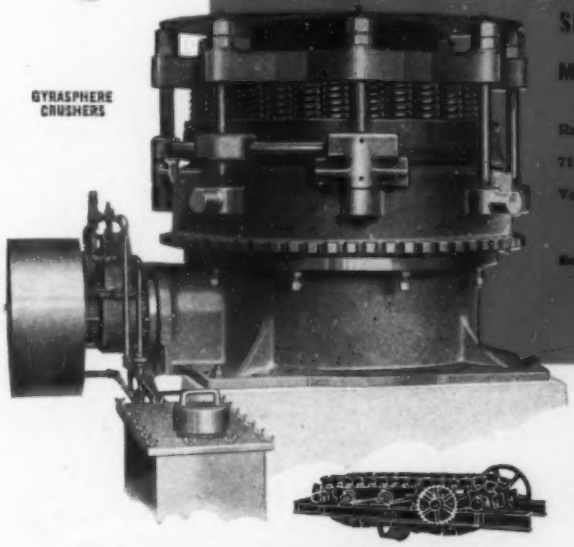
PRIMARY BREAKERS


REDUCTION CRUSHERS

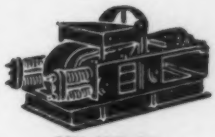
BELT AND BUCKET ELEVATORS

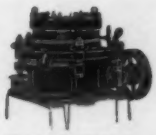
GRIZZLIES


SAND CLASSIFIERS


GYRASPHERE CRUSHERS

HEAVY DUTY FEEDERS


ROLL CRUSHERS


INTERCONE CRUSHERS

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You have to look ahead these days! Line up your equipment *now* . . . be all set to push your production to new peaks and bigger profits. This new 36-page illustrated equipment guide will help you . . . whether you're expanding or modernizing your present plant, or building a brand new one. It gives you the latest developments in rock, ore and gravel handling machinery. Shows you exactly how to pick the right type, model or size that will best fit your particular needs. *Ask for new Telsmith Equipment Guide E-11.*

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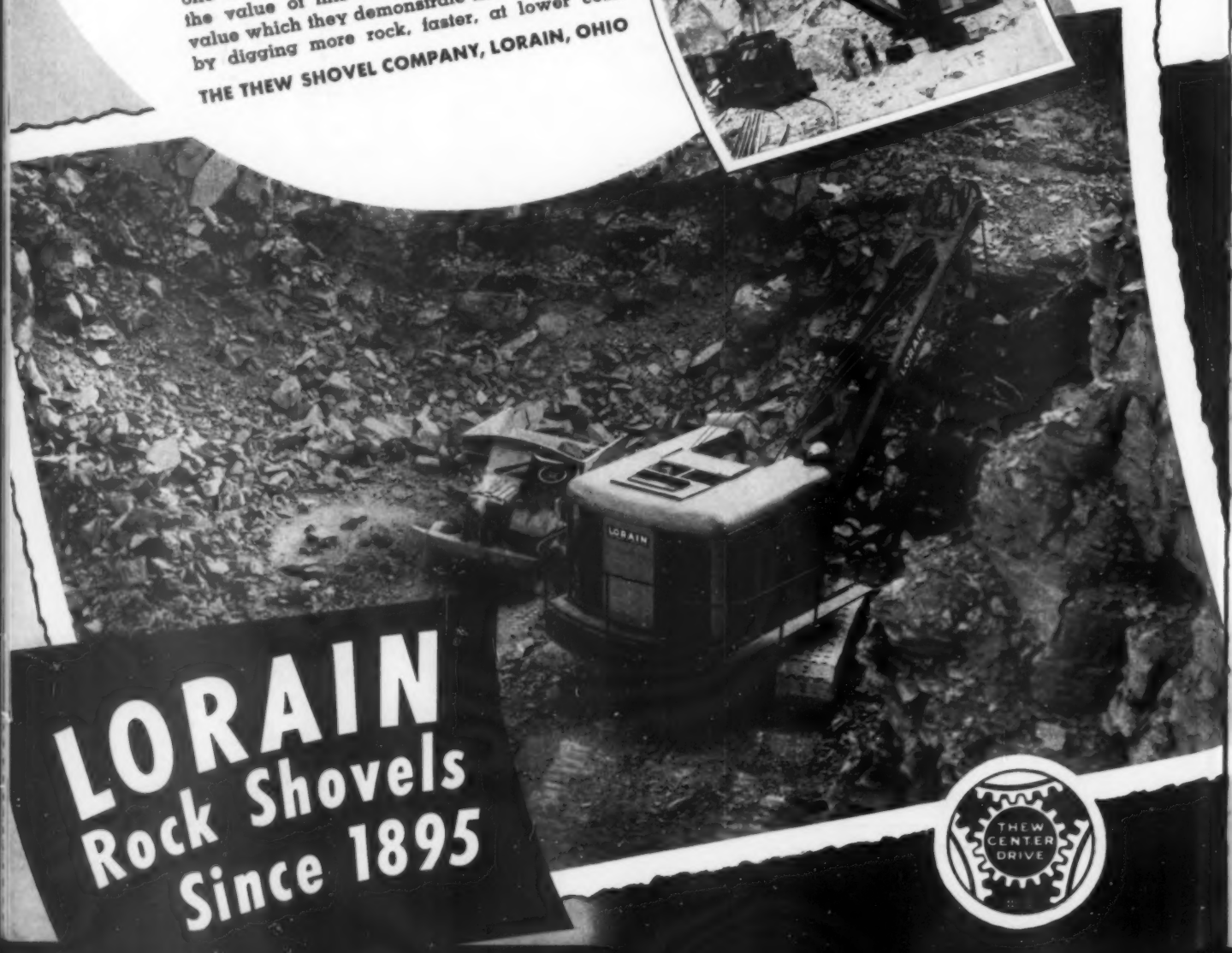
E-3

ROCK is no TOUGHER today than in 1895

• You can't do the same thing for 47 years and not learn a lot about it—and Thew started to learn about rock shovels in 1895, when the first Thew was produced.

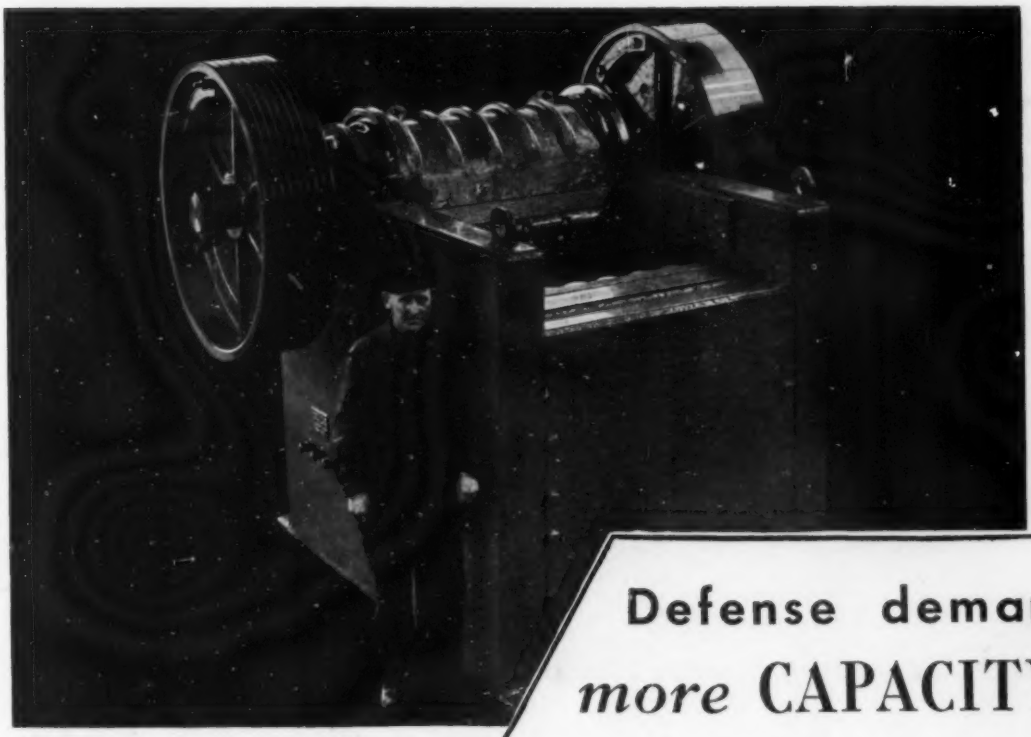
Though rock is no tougher today than in 1895, Thew-Lorain rock shovels are! The new, modern 2-yd. Lorain-82 pictured below typifies the latest in Thew's long line of rock shovels. It's a vast improvement over the "old timers," shown above, in power, strength, speed and output. It's but one of the many current Lorains that reflect the value of this 47 years' experience . . . a value which they demonstrate in today's terms by digging more rock, faster, at lower cost.

THE THEW SHOVEL COMPANY, LORAIN, OHIO



LORAIN
Rock Shovels
Since 1895

THEW CENTER DRIVE



● *Built by Pioneer Engineering Works, Inc.*

Defense demands *more* CAPACITY

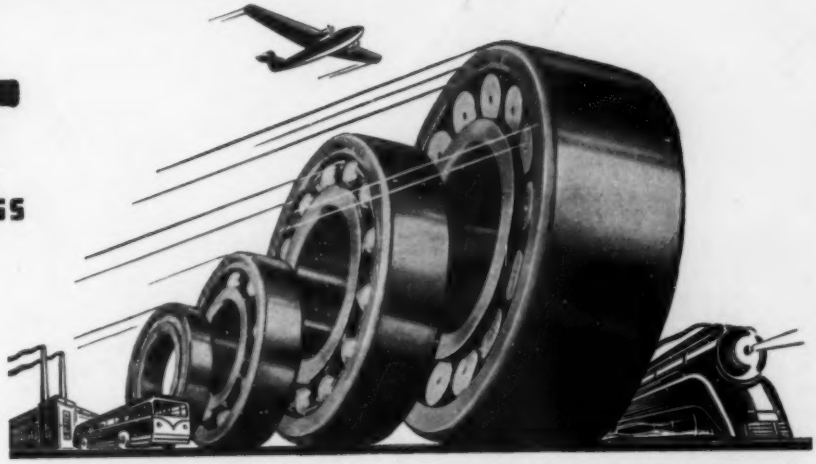
Pioneer engineers say: "Large defense projects call for greater capacities, and the output of any quarry plant cannot much exceed the crushing capacity of the Primary Breaker. The result of these persistent demands on the part of operators is the Pioneer Roller Bearing 3042 overhead, eccentric type Crusher with the important operating advantages of SKF Spherical Roller Bearings."

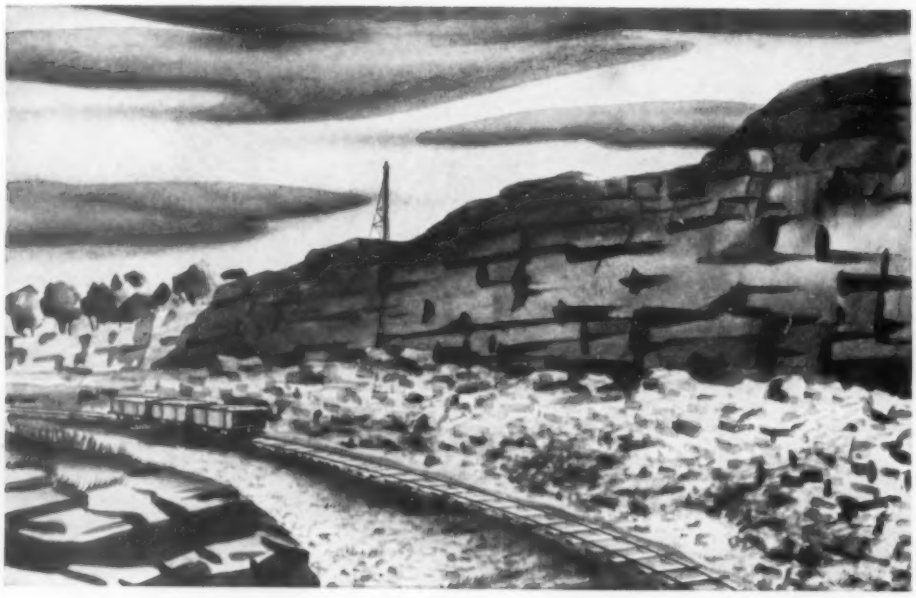
4957

SKF INDUSTRIES, INC., PHILA., PENNA.

SKF

BALL & ROLLER BEARINGS





★ ★ ★ ★

Confidence

BUILT THROUGH DEPENDABLE SERVICE

AMERICAN CYANAMID & CHEMICAL CORPORATION
EXPLOSIVES

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THE policy of American Cyanamid & Chemical Corporation is to manufacture explosives and blasting supplies of the highest quality, and to supplement them with competent research and technical services to the end that industry may profit by their use.

These services begin in the research laboratories and at the plants.

Modern laboratories have been provided for accurate control of processes and products. Research is carried on continuously by trained chemists on problems pertaining to the manufacture and use of explosives and blasting supplies. Plants are located at points near the sources of raw materials and convenient to the industries they serve.

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Distributing magazines are located at strategic points. These are under the care of personnel trained in the handling of explosives. It is their responsibility to properly care for stocks and maintain facilities which enable them to render prompt delivery service.

The consummation of these carefully planned steps results in consumer "Confidence Built Through Dependable Service."

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SERVICE INTEGRITY RESPONSIBILITY
ORGANIZED 1917

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IN THE PRODUCTION OF
CRUSHING - SCREENING - WASHING -
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No Shovel Boom Failures!

No shovel boom of Northwest design and construction produced since 1932 has ever failed . . . . . — a nine year record!

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says this Superintendent

● "This report tells a story of improved lubrication practice," says this superintendent. "You'll note that we're getting a considerable increase in plant output by following Gulf Engineering recommendations. This 'production bonus' is the direct result of more efficient operation of equipment and a big reduction in shutdowns and delays."

Production and maintenance reports covering hundreds of industrial operations show that *definite, measurable* benefits are secured with the help of Gulf Engineering Service: maximum protection against machine failures and delays, most efficient machine performance, and minimum power consumption. *Your* plant, too, should get these benefits of the best lubrication practice. Investigate—call in a Gulf engineer today. His thorough training and broad practical experience with equipment similar to yours can go right to work in your plant as soon as you say the word.

The services of a Gulf engineer—and the Gulf line of 400 quality oils and greases—are quickly available to you from 1200 warehouses in 30 states from Maine to New Mexico. Write or 'phone your nearest Gulf office today

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The New Arsenals of Democracy

Wielding a major influence along the entire defense construction front are hundreds of MARIONS, all doing their "bit" in speeding up material handling and furthering the cause of democracy. In the sand, gravel and crushed stone industries alone, hundreds of MARIONS are digging and loading the materials so essential in building vital modern defense plants — and doing the job in record time.

THE MARION STEAM SHOVEL COMPANY
MARION, OHIO, U. S. A.
Serving industry since 1884 — *Offices in all principal cities*

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SHOVELS • DRAGLINES • CLAMSHELLS
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Gasoline — Diesel — Electric — ⅜ cubic yard to 35 cubic yards

IF your equipment requires UTMOST resistance to both HEAVY IMPACT and ABRASION

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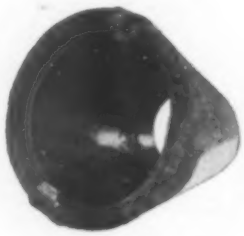
Specify TISCO MANGANESE STEEL

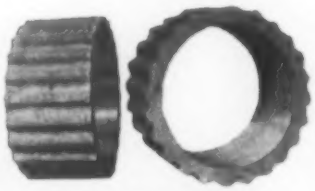
"the harder it works— the tougher it gets!"

TYPICAL TOUGH JOBS WHERE MANGANESE STEEL IS USED...

TWO CU. YARD DREDGE DIPPER



CRUSHER MANTLE



CORRUGATED ROLL SHELL

It is a distinctive characteristic of TISCO Manganese Steel that the more it is subjected to heavy pounding, shock, abrasion, wear and tear — the harder, more wear-resistant it becomes.

Of all ferrous metals, this unusual feature is found in the highest degree in Manganese Steel, which explains why quarriers, pit operators and equipment manufacturers alike specify TISCO Manganese Steel for wearing parts in crushers, dippers, hoppers, chutes, screens, etc. In every instance, service life has been extended from 2 to 10 times that obtained with any other metals.

When ordering equipment or replacements for wearing parts, specify TISCO—the Manganese Steel that made trap and granite rock crushing commercially possible—made by America's oldest iron and steel manufacturer and first to produce Hadfield's Manganese Steel in the United States. Our modern facilities are equipped to produce castings from ½ oz. to 20,000 lbs. Consult with our metallurgists and engineers on any application. Write for technical literature giving the unusual physical properties of TISCO Manganese Steel.

1742 -- OUR 200th YEAR -- 1942

Welcome to
BOOTH No. 1
at the Conventions of
NATIONAL SAND AND GRAVEL ASS'N.
and
NATIONAL CRUSHED STONE ASS'N.
Cincinnati, Jan. 28—Feb. 5

TAYLOR-WHARTON IRON AND STEEL COMPANY

HIGH BRIDGE, NEW JERSEY, U. S. A.
PLANTS AT HIGH BRIDGE, N. J. — EASTON, PA.

Offices: BOSTON CHICAGO CLEVELAND DETROIT NEW YORK PHILADELPHIA PITTSBURGH SCRANTON SAN FRANCISCO
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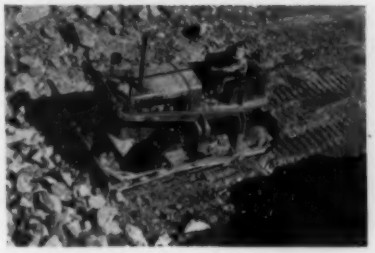
Now 2-CYCLE THE MODERN DIESEL!

A NEW KIND OF POWER!

Under the hood of an Allis-Chalmers tractor purrs the smoothest-running Diesel engine you've ever heard . . . the most powerful for its size you've ever seen! It is the 2-Cycle . . . the modern Diesel! Every stroke is a power stroke . . . double the strokes of an ordinary Diesel — smooth, hard-hitting power that gets more work done, and at the same time is easier on your tractor and pocketbook. It is power that starts instantly—no cranking, no warm-up . . . no loss time getting to work. It is power that is operated more with the throttle, less by gear shifting. When the going gets tough, the 2-cycle engine "hangs on" with "steam like" tenacity. Instead of shifting, you just open the throttle. There is instantaneous, flashing pick-up!

Built around this engine is a stronger, more efficient tractor . . . streamlined in appearance and performance . . . with extra time and cost-saving features, such as: stronger clutches and brakes, longer-life tracks and a Positive-Seal truck wheel assembly that requires an oil change only once in 200 HOURS — no need now to take ½-hour out of every shift for greasing! Here's EXTRA WORKING POWER . . . MORE ECONOMICAL POWER . . . MORE PROFITABLE POWER — the kind you want! Investigate! See your Allis-Chalmers dealer . . . NOW!



Large Photo: Battle Creek Gravel Company, Battle Creek, Michigan, uses this 2-cycle Diesel tractor and Gar Wood scraper to speed-up stripping and building of roads into pit.

Small Photo: Sock it to 'er! Here the operator for Lange Bros., Tehachapi, California, "guns" the Model HD-10 through a cleaning-up job at Quatal Canyon Gypsum Quarry.

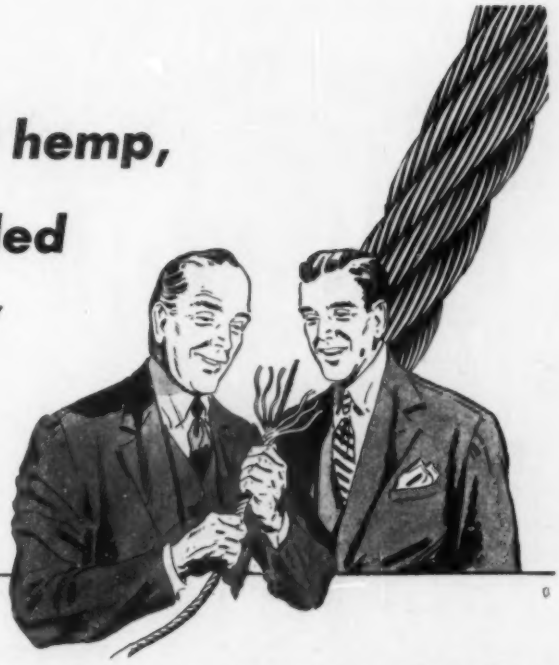
ALLIS-CHALMERS
TRACTOR DIVISION · MILWAUKEE · U. S. A.

2-CYCLE DIESEL POWER

3 SIZES: HD-7, HD-10, HD-14 — 60 TO 132 DRAWBAR H. P.

Instantaneous Dumping
IMPORTANT—Simplicity . . . no mechanical body hoisting machinery . . . dumping by gravity, instantaneously . . . saves seconds with every load . . . body is dumped by releasing body latch with lever.
KOEHRING
Making The Dirt Fly... Uphill
This action "shot" speaks! It tells the story, better than words, that the Koehring Dumptor dumps the load instantaneously, and uphill! Seconds are saved with every load! Every load is dumped instantaneously and completely, exactly where wanted. Being without mechanical operating parts for hoisting and dumping, the Koehring Dumptor does not consume time preparing to dump. The balanced body returns to loading position by force of momentum. Instantaneous gravity dumping cuts round trip time, increases production. Check your hauling operations and see how much time you are losing on the fill!
KOEHRING COMPANY · Milwaukee, Wisconsin
KOEHRING HEAVY DUTY
HEAVY-DUTY CONSTRUCTION EQUIPMENT

"You put in steel, and hemp, and something called Experience . . ."



It's something only time and tasks can bring

"Make all the tests you want of wire rope samples. Pull them apart, into steel and hemp, and still you'll never find the quality that's paramount. The makers' experience . . . *knowing how.*

Our experience here at Roebling has two dimensions. You can count it on the map or on the calendar. You can see it working from the ingot to the finished reel.

When Doctor Beebe's Bathysphere sank down into the ocean's depths, a full half mile, his lifeline back to sunlight was a single length of Roebling "Blue Center" Wire Rope. When the builders of Mud Mountain Dam, Enumclaw, Washington, built a 35,000 pound tent that would cover half a city block, to protect their fill, Roebling Wire Rope was chosen to support its immensity, to hold against wind and rain.

Equipping the world's largest power shovel . . . building the Golden Gate and George Washington bridges . . . lifting lives from the world's deepest mine . . . Roebling is both the teacher and the pupil, whenever we tackle such a job. All across the country, on its lakes and oceans, Roebling's learning every day ways to make "Blue Center" better than before. Experience . . .

As Roebling field men learn from rope at work, new generations here at Trenton are learning secrets from the old. Father is teaching son how to tell when an ingot is ready to leave the soaking pit, to be kneaded into Roebling billets. Roebling engineers are learning more and more of wire rope's jobs, and how to meet them to a "T".

Roebling research is uncovering brand new facts that will make this trade mark mean even more to-morrow . . ."

JR ROEBLING

Experience of men in the Roebling mills, of Roebling men in the field . . . Roebling process control, and engineering, and research . . . there's many a hidden ingredient in "Blue Center" Wire Rope. Reasons why it lives so long, and never fails to deliver its full measure of service.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, NEW JERSEY
Branches in Principal Cities

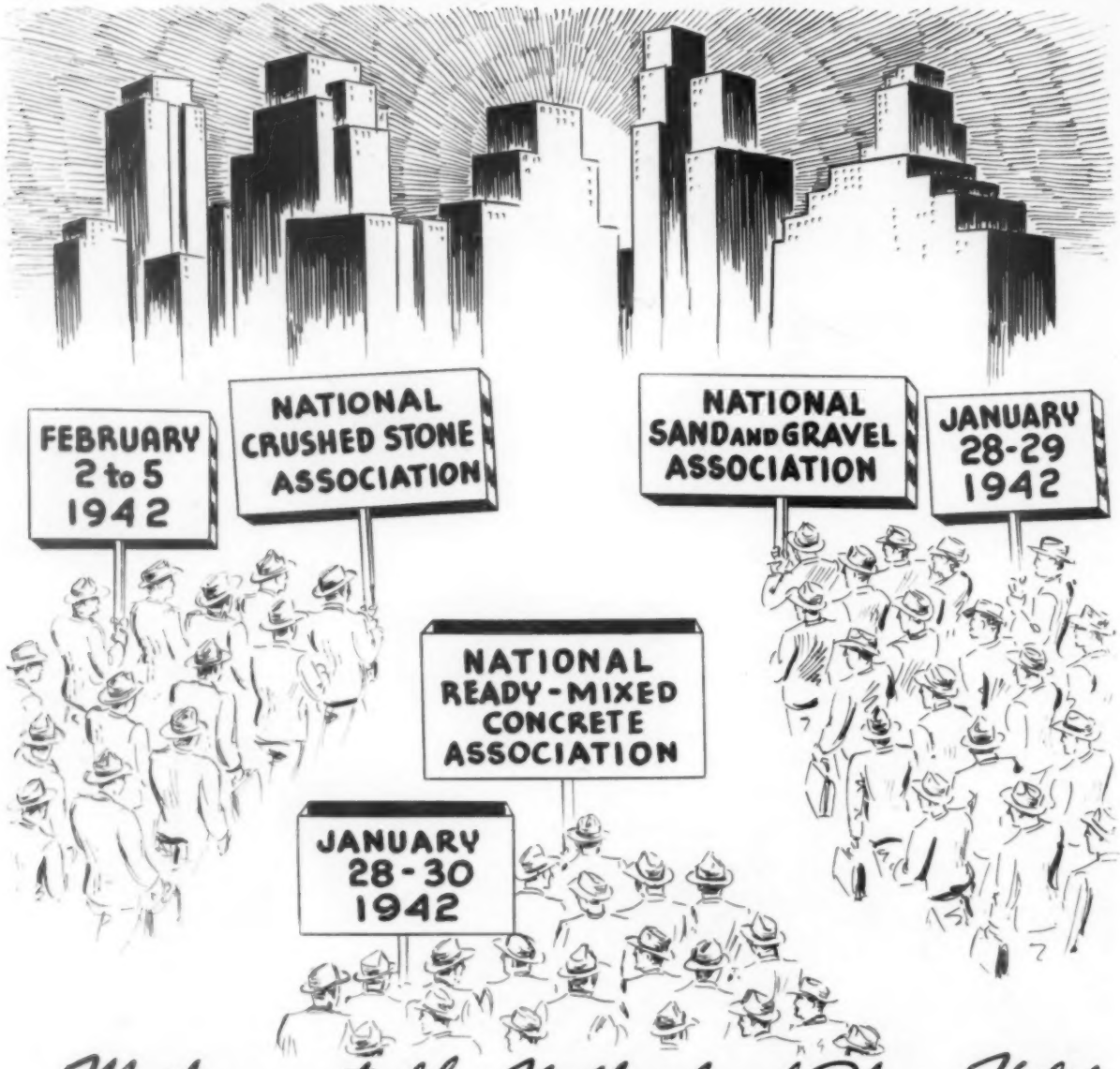
THAT'S THE ONLY WAY TO MAKE

ROEBLING

"Blue Center"

STEEL WIRE ROPE

PREFORMED OR NON-PREFORMED



Meet you at the Netherland Plaza Hotel

CINCINNATI, OHIO

- Most Critical Period in American Industry
- Greatest Opportunity Ever Offered the National Industrial Associations
- Exhibit of Up-to-date Machinery and Equipment
- Opportunity to Confer with Brother Producers
- Renew Old Friendships
- Help Our Nation Solve Its Problems
- Help You Solve Yours

ENOUGH SAID!!!

Be sure the shovel you buy measures up to this "yardstick"

The Buckeye Vacuum Power Control Clipper Shovel *does!*

	Vacuum Control	Ind. Chain Crowd	175 F.P.M. Min. Hoist Speed	Tubular Dipper Stick	Shatter-Proof Glass	Max. Digging Radius 23' 2"	Max. Dump Height 17' 4"	Safety Power Drum Brakes	Min. 535 R.P.M. Swing	2.25 M.P.H. Top Travel Speed	Simultaneous Swing, Hoist, Travel	4 Anti-F. Bearings w/ Hook Rollers	All F. Bearings on Main Mchy. Shafts	Min. 15" Crawler Treads	Min. 10'-2" Crawler Length	Ample Work Space in Cab	Power Boom Hoist and Safety Brake	Extra Hardened Gears	Automatic Swing Brake	Over 12" Ground Clearance	Gear Universal Power Hook-Up	Vacuum Power Trip	Over 47 H.P. Rating	Weight over 27,000 lbs.
Clipper Model 50	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Shovel No. 2	No	No	Yes	No	No	No	No	No	No	No	No	Yes	No	Yes	Yes	No	Yes	No	No	Yes	Yes	No	Yes	Yes
Shovel No. 3	No	No	No	No	No	Yes	No	No	No	No	Yes	No	No	Yes	Yes	Yes	No	Yes	No	Yes	No	No	No	No
Shovel No. 4	No	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	No	No	No	Yes	Yes	Yes	No	No	Yes	No	No	No	No	Yes
Shovel No. 5	No	Yes	No	No	No	Yes	Yes	No	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	No	No	No	No	No
Shovel No. 6	No	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Yes
Shovel No. 7	No	Yes	Yes	Yes	No	Yes	Yes	No	No	No	No	No	No	Yes	Yes	No	Yes	Yes	No	No	Yes	No	No	Yes
Shovel No. 8	No	Yes	Yes	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	Yes	No	No	No	Yes
Shovel No. 9	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	No
Shovel No. 10	No	No	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	Yes	Yes	Yes	Yes	No	No	No	No	No	No	Yes
Shovel No. 11	No	Yes	No	No	Yes	Yes	Yes	No	No	No	No	No	No	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes
Shovel No. 12	No	Yes	Yes	No	Yes	Yes	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes

Vacuum Power Control Clippers speed stripping operations and get out more loads per day, for pit and quarry operators.

Of the 24 foremost preference points—design, construction and operating features that most operators prefer—the Buckeye-built Clipper has all 24 *plus* all of the accepted practices of shovel construction.

This gives Clipper owners the inside track on digging jobs—more yards per day—fewer days per job—more yards handled per dollar of investment. It's the outstanding buy in the small shovel field. It's tomorrow's shovel *today!*

Model 50	Model 60	Model 70
½ yd. ✓	⅝ yd. ✓	¾ yd. ✓

Gasoline or diesel. Quickly convertible to crane, dragline, trench hoe or pile driver.

BUCKEYE TRACTION DITCHER CO.
FINDLAY, OHIO

Built by Buckeye ✓

Convertible Shovels

Trenchers

Tractor Equipment

R-B Finegraders

Road Wideners

Spreaders

All IN THE Same Boat FOR '42

WARTIME brings to the ROCK PRODUCTS field the *biggest production year in history* . . . meaning that *every* manufacturer and *every* user of machines must USE HIS INGENUITY to make the most of his raw materials and equipment in order to stretch production to the limit.

Plant extensions, new industrial plant construction, cantonments, ordnance plants, access roads, naval bases, airports, defense housing, officers quarters and other wartime construction will *increasingly* demand the utmost INGENUITY OF BOTH MACHINERY PRODUCERS AND USERS.

ONLY THROUGH ROCK PRODUCTS can advertisers tell the RESPONSIBLE BUYERS of equipment their current *direct sales message* . . . tell *how to use machinery to best advantage* . . . *how to keep equipment in service longer* . . . *what equipment is or will be available and when.*

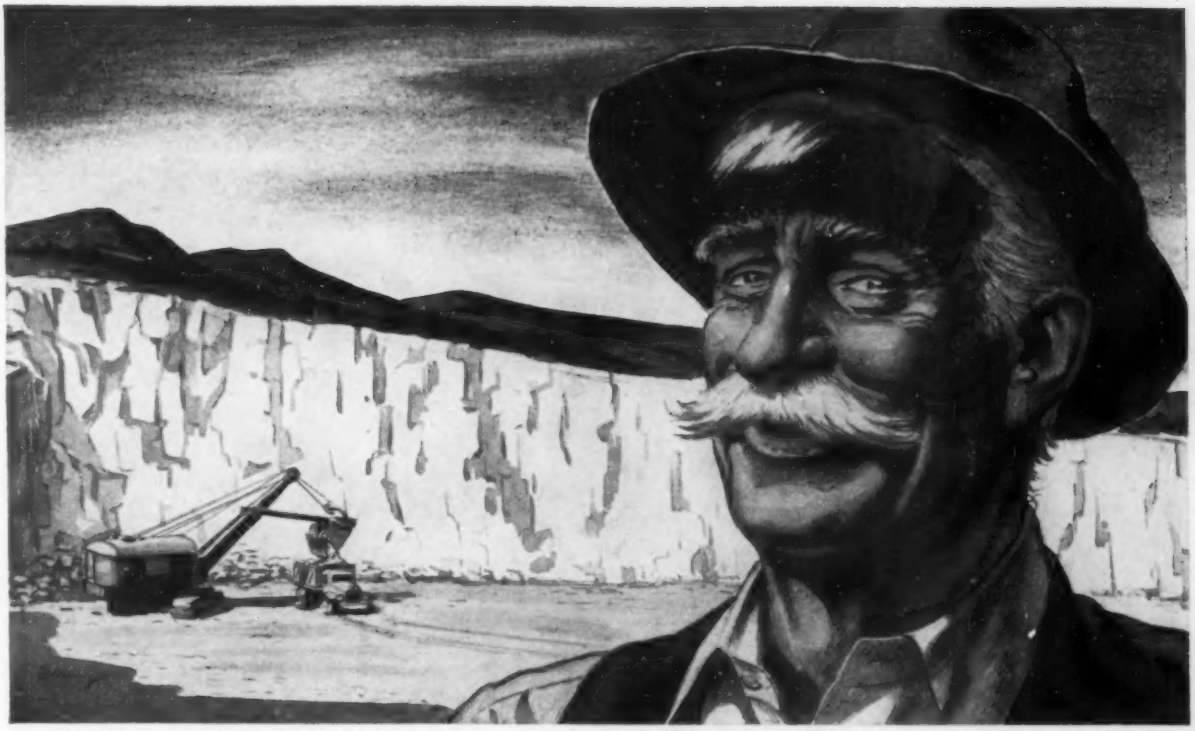
Not only is ROCK PRODUCTS' coverage of its field *vital to all advertisers who want to maintain their standing* in the industry for the duration . . . *ROCK PRODUCTS' field is already being prepared for its basic production job in RECONSTRUCTION AFTER THE WAR.*

Show your ingenuity in war and post-war production by following the tactics of others . . . TELL YOUR MESSAGE *NOW* IN THE AUTHORITATIVE PAPER, *ROCK PRODUCTS.*

Rock Products

309 W. JACKSON BLVD. • CHICAGO, ILLINOIS

For 40 Years the Recognized Authority in Its Field



Joe tells why it costs less to quarry stone today

"QUARRYING SURE HAS IMPROVED. It's a good thing, too, or we'd never get out enough stone for all the new roads and the other construction for national defense.

"They tell me that powder costs alone have been cut 30% right here since the old days, and I can easily believe it. Just

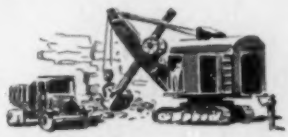
take the saving on secondary shooting. What with these new powders and new ways of shooting, the rock's most all laid down ready for the shovel.

"It wasn't like that when I first came on this job. The stone wasn't broken up so nice, and it was pretty tough on those old shovels trying to load that big stuff.

"It was the Hercules people that started the ball rolling to cut down costs and boost production. They were the first ones to introduce Hercomite*—you know, the powder with lots more sticks in a case. Folks couldn't get the notion at first. But now look at it. Hercomite's used in quarries all over the country and it cuts costs nearly a third in some places.

"Of course, they've been improving Hercomite all the time; and then Hercules brought out that Gelamite* that we could use in wet holes, which saved some more money. You can use wagon drills, well drills, or coyote holes. It doesn't make any difference whether you shoot every day or only once a year, there's a way to do it with one of these Hercomites or Gelamites that will break the stuff just the way you want it.

"Yes, sir, we do a better job around a quarry now, what with the big improvement in the explosives, shovels, drills, and transportation equipment, too: and I figure a lot of the credit belongs to Hercules and the Hercules service men. They got there first with these modern high-count powders, and with all the researching and improving they're doing it looks as if they aim to stay ahead."



HERCULES POWDER COMPANY
INCORPORATED
946 KING STREET, WILMINGTON, DELAWARE

*Reg. U. S. Pat. Off., by Hercules Powder Co.

D-13

HERCULES

EXPLOSIVES AND BLASTING SUPPLIES

25,000,000 *tons - a lot of stone*

This S-A Elevator was built for a New York Crushing Plant. It is 143 feet long. . . . Buckets are 72" wide, each has a capacity of 10 cu. ft., and are carried on 30" pitch chain. . . . The head shaft is 12" in diameter and buckets are hinged on 2 15/16" diameter cross rods.

This S-A Bucket Elevator installed in 1909 still going strong

Unusual?—Yes, but not unusual for conveying equipment designed and built by S-A. . . . True, it had excellent care, regular lubrication and the maintenance all good equipment deserves . . . but think of the punishment it took in handling 25 million tons of quarry-run stone. . . . It is no accident that this Elevator is still on the job after 33 years of service. . . . As usual, S-A Engineers built it for low ultimate cost per ton.

How S-A Engineers Can Do It—They do not attempt to sell a "standard Conveyor" or "standard Elevator" . . . Instead, they build standard **units**, such as buckets, chains, sprockets, gears, bearings. . . . All in sizes to suit capacities large and small. . . . S-A Engineers then study customers' materials and conditions (present and future) and specify the **units** best suited to complete a truly successful Conveyor, Elevator or complete installation.

S-A Builds Conveyors, Elevators, Screens and Complete Material Handling Installations—We are not limited to any one type, but can give you the **best** units for your purpose. . . . Let our experienced Engineers help you get the most out of your equipment—new or existing.

Stephens-Adamson Mfg. Co.
7 Ridgeway Ave. Aurora, Illinois
Western Plant Los Angeles, Calif.
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"IT COSTS LESS PER TON THE S-A WAY"

S-A CONVEYORS

Engineering Offices—BOSTON • BUFFALO • CHICAGO • DETROIT • LOS ANGELES • NEW YORK
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Rock Products

309 WEST JACKSON BOULEVARD
CHICAGO, ILL.

January 1, 1942

Dear Subscriber:

Chicago, Ill.: Returning from a Rocky Mountain trip an editor finds producers who have had successful experience in defense construction going constantly farther afield to get more - and there is enough more in sight in this section to help keep these producers as busy in 1942 as they have been in 1941. Business in 1941 was so good that they are returning better than 50 percent of their profits to the government in corporation taxes. When they get through with their taxes as individuals they will find they have put in a hard year's work for Uncle Sam. But, like all good Americans they are anxious to repeat in 1942.

Chicago, Ill.: A sidelight on this western trip should interest producers. It comes from machinery manufacturers primarily interested in the metal and coal mining industries. They anticipate a big slump in these industries following the war because these industries have expanded beyond any conceivable peace-time demand. Hence these mining machinery manufacturers are anxious to have their names become familiar in the rock products industries, convinced as they are that the war will be followed by a tremendous public works program.

Washington, D. C.: While collecting data on the prospective consumption of critical materials in the sand and gravel and industrial sand industries in 1942, for use of the O.P.M. in allocating those scarce materials, Executive Secretary Ahearn, of the National Sand and Gravel Association, warns his members that they are in a situation in which shortages of everything made of metals and critical materials will become progressively more acute. He adds that the industry has a patriotic obligation to conserve these critical materials, to get everything out of them which can possibly be gotten, and to use ingenuity in prolonging the life of the materials which this country needs to carry out its war program.

Chicago, Ill.: The above sincere appeal for "ingenuity" in prolonging the life of materials and equipment reminds us editors that for more than twenty years we have been publishing in our "Hints and Helps for Superintendents" just such examples of "ingenuity". At times we have incurred the wrath of advertisers and our own advertising space salesmen with these examples of "ingenuity", but we have persisted in this editorial feature, and its long-time popularity has justified it. Now we have the satisfaction of seeing national advertisers in many lines using their space to maintain the good will of customers by suggesting just such "ingenuity" to preserve the life and usefulness of their products. We figure ROCK PRODUCTS has built up considerable good will with subscribers along that line in the 20 - odd years.

Buffalo, N.Y.: M. H. Baker, president of National Gypsum Co. is quoted: "At the present time it appears that defense activities will absorb only a part of capacity, but steps are being taken to divert more of the company's production to

war efforts as needed. Prospects in the construction field for 1942 are faily good. O.P.M. has estimated that a minimum of 400,000 private homes will be built in 266 defense areas. In addition to this housing program, it has been estimated that repairs, additions and alterations for the coming year will reach a new peak of $3,000,000,000 and that there will be a substantial increase in farm building. The company's plans for 1942 are predicated on close to capacity production throughout the year. Increased sales and operating economies have made possible a successful year for the company despite an increase in taxes on profits from $500,000 in 1940 to approximately $2,000,000 during the last 12 months' period."

Washington, D.C.: The President continues to reap the harvest in accordance with the seeds he has sown. He appoints a labor-industry-public conference of big names, which after failing to agree for several days, brings in a plan for industrial peace. The plan provides there shall be no strikes or lockouts, all disputes to be settled peacefully, and finally, the President is to set up a proper board to say how these objectives can be accomplished. If it were not pathetic or tragic it would be funny. It is a commentary on the fact that the President never has and probably never will give anybody authority to settle anything; knowing this his innumerable boards and commissions simply drop their (and his) problems right back in his lap.

Washington, D.C.: A new estimate made by the O.P.M. sets the 1942 construction total at $11,250 million, nearly a billion dollars' increase because of the war. The new estimate is a record for all kinds of construction undertaken in the United States. The 1942 building is limited to defense construction or construction "essential to health and safety." The previous forecast of $10,400 million was a slight decrease from the $11 billion expected to be spent in 1941. O.P.M. said there will be large increases in direct military construction and government-financed defense plant expansion, defense housing and community facilities. In every other major category, there will be decreases of varying degrees, it was stated.

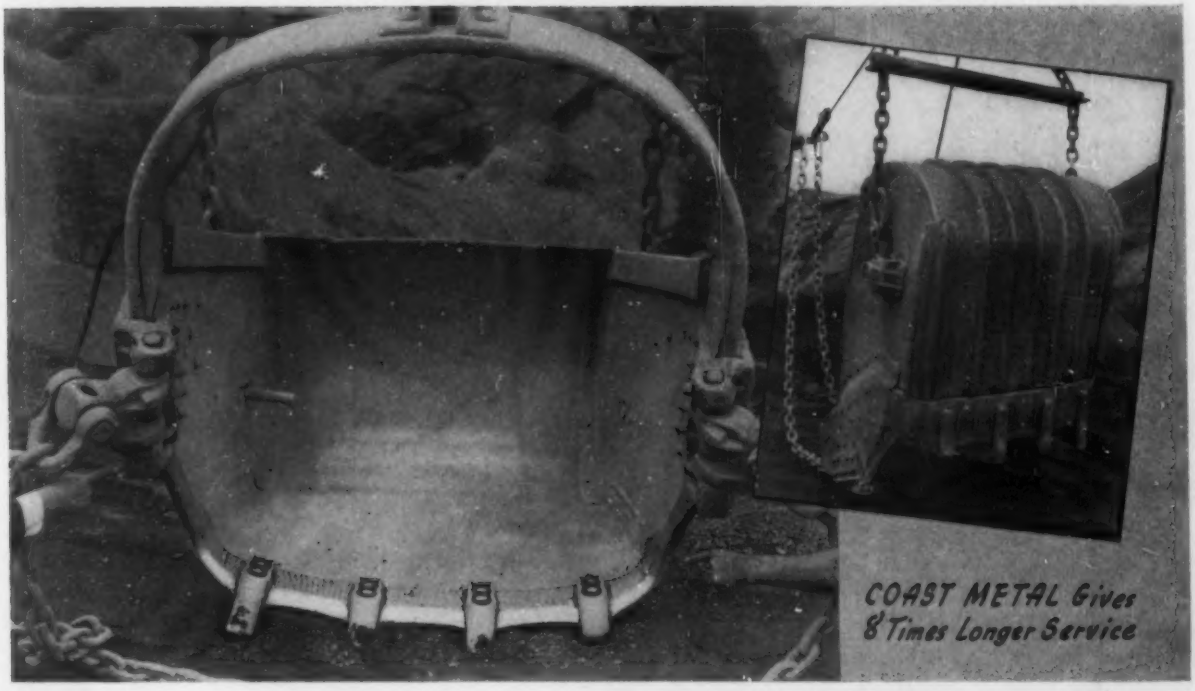
Allentown, Penna.: One of the Lehigh Valley cement companies discharged two employes. Their union battled for their reinstatement. The controversy was referred to an arbitrator, mutually acceptable. The arbitrator was Alexander H. Frey, professor of law, Columbia University. Part of his decision reads: "Looking at the contract (between the company and the union) as a whole, there can be no doubt that its primary purpose is two fold; on the one hand, to safeguard the company from strikes or other concerted action against it resulting from labor disputes; and on the other hand, to insure to the employes a degree of security from discharge which they would not enjoy in the absence of such a contract. * * * * An employee can have no greater grievance than a belief that he was unjustifiably discharged. * * * * The effect of the contract is to change the status of the employes from that of employment at will, to employment for a term of indefinite duration; and as in the case of every contract of employment for a term, the employer has abrogated his privilege of discharging arbitrarily or capriciously, and has retained merely the privilege of discharging for 'cause.' Therefore, my function as arbitrator, even in the absence of the express agreement to arbitrate, is to determine whether the discharges in question were for cause. * * * * The burden is upon the employer, if challenged, to show that the discharge was for 'cause' and hence not in violation of his agreement to discharge only for 'cause'." The two employes were reinstated. The philosophy back of this decision is undoubtedly that which will be generally adopted.

The Staff

COAST METALS

KEEP THEM IN SERVICE

Save a lot of Money too! . . . . .



War DEMANDS—
PROLONGED LIFE OF YOUR EQUIPMENT

Using COAST METALS to build up and hard surface your equipment which becomes worn readily will save you a lot of money and ORDERS, too, now more than before. The shortage of critical materials used in machinery, due to our war effort, demands that maximum service be obtained—COAST METALS will lengthen the life of your equipment as well as keeping it in service just when you need it most, without having to worry about priority ratings on replacements.

The extra life you get from your equipment with COAST METALS can easily be seen from the experience of Edward C. Levy & Co., Detroit, Mich., who hard surfaced the dragline bucket shown above with COAST METAL No. 110. One coating along the entire bottom, lip and knuckles gave them eight months of continuous service in a hot open hearth slag dump, without any repairs, and the bucket is still in good condition—An uncoated bucket on this job would have required repairs every thirty days, including new wear strips, lip, knuckles, etc. This is a typical example of the savings to be had by using COAST METALS.

You, too, can find many uses for COAST METALS in your plant. Our engineers will be glad to help solve your maintenance problems.

COAST METALS, INC.

Canton, Ohio Watsonville, Calif.
117 Liberty St., New York City

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Rolling with
COAST METALS

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First in 1926
Still First in 1942

Many producers of crushed materials still recall the interest that greeted the introduction of the Symons Crusher in 1926. This revolutionary process of crushing was the greatest advancement ever made in the field of reduction crushing. The immediate acceptance of this Crusher by producers of finely crushed materials had no parallel with any piece of machinery used for a similar service.

Since then, many improvements have been made in Symons Cones to meet the changing demands arising from the trend toward a greater use of the smaller sizes. One important development was the Symons Short Head Cone which permits of much finer crushing than was possible with the original Standard Cone.

Outstanding as was the performance of the Symons Cone at the time of its introduction, it is still the choice of modern crushing plants where capacity of fine product and lower crushing cost are considered in the selection of crushing equipment.

NORDBERG MFG. CO.
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NEW YORK · LOS ANGELES · LONDON · TORONTO

SYMONS CONE CRUSHERS

RETROSPECTIVE AND PROSPECTIVE

THIS January Annual Review editorial was to have reviewed the experience of our industries with priorities and to have attempted to make constructive suggestions regarding the future. When our correspondence went out and most of the replies were received, the war had not actually begun in the Pacific. Undoubtedly the attack on Pearl Harbor by the Japs caught all of us as much by surprise as it did the Admiral in command of the fleet—and with more justification. That event has so changed the picture for all of us engaged in any kind of industry or business, that little of value can be gained on the basis of experience of the last year—when some 15 percent of our national resources were required for defense as against some 50 percent to be required now for waging war on the five continents and the seven seas.

From a group of producer friends we sought information on: (*a*) their difficulties in procuring necessary equipment and supplies; (*b*) the present labor situation and outlook; (*c*) the present price situation and outlook. We are indebted to numerous of these friends for full and complete analyses of the situation of the industry in their localities, and having in mind how the picture has changed since Sunday, December 7, 1941, we will endeavor to extract and abstract such information as will still be helpful to our industries and instructive to such Federal Government Departments and Bureaus and Commissions as will deal with our industries on a war-time basis.

Priorities

It has been suggested to us that we agitate for the organization of a War Service Committee, similar to that of 1918, to represent all our three mineral aggregate industries. However, the situation of the mineral aggregate industries in 1941 is quite different from that of 1918. These industries are now well organized and well established with capable and experienced managements. They are constantly on the alert to protect the interests of these industries, but they also have much better understanding of national needs and necessary industry sacrifices than any committee of producers could have. We know that the three national association managements will coöperate and act as a unit in all matters of common concern now as they have in the past. Therefore, our only advice in this connection is for each and every producer to support his national association to the utmost; if not now a member, make it his business to join at the earliest possible moment.

Up to the middle of December the situation was already such that it was practically impossible to get equipment and renewal parts without an A-10 or better rating. Those engaged in supplying material for defense jobs, and who have kept informed on the ways to obtain priority ratings, had experienced very little difficulty and few serious delays up to the time of this investigation. However, all anticipated, even before the declaration of war, more difficulty in 1942. The P-56 priority order extending an A-8 rating to repair parts and supplies (subsequently, A-3) for mine and quarry industries did not include cement mills, lime plants, gypsum plants, concrete products plants, etc., which processed the output of the mines or quarries,—at least, that is the interpretation in some instances we know about. Cement-plant quarry repair parts were included, but not mill parts; however, nearly all the active cement plants had a large percentage of output going to defense jobs, and therefore experienced little difficulty in obtaining machinery and equipment. Sand-lime brick, gypsum and concrete products plants, unless filling orders for defense jobs (defense housing, etc.) have experienced considerable difficulty.

There have been delays in delivery of needed equipment in some instances, and some manufacturers of equipment have been more finicky (or more conscientious) than others. For example, a lime manufacturer tells us he placed an A-10 priority order for a 30-in. gage 5-ton gasoline locomotive, only to be informed by the manufacturer that O.P.M. had ordered no sales of locomotives on anything less than an order with A-3 rating. We believe the lime manufacturer could have obtained an A-3 or better rating on his order as "an emergency replacement," since he is filling defense orders. However, our lime friend was rather disgusted and remarks: "When O.P.M. issued the order, the mind behind the typewriter probably was thinking of locomotives for the Union Pacific streamliners."

The little human interest touch we have given above illustrates the need for sympathy and coöperation on the part of all industry, regardless of our previous (or present) convictions regarding the incapacity of government officials to deal with the situation efficiently, or even intelligently. A considerable number of our machinery manufacturer friends emphasize this point: that producers *must* help themselves by securing all the necessary government forms, etc., etc. It is annoying to the extreme, but it is apparently a necessary sacrifice to a democracy at war. From English contemporaries we learn that even after two and a half years of war, they have found no more effective ways to get

results. England (or rather Great Britain) is a small country compared to ours, and presumably much more efficiently governed, yet there are 21 different government departments in Britain with which a quarry operator must deal and he has at least a hundred forms to fill out.

A manufacturer friend tells us that in the early stages of the priority system, the reluctance of producers to accept any "dictation" from government led in some instances to absolute refusal to fill out the requisite forms for priority rating. That attitude on the part of an old and good customer of a machinery manufacturer was (and still may be) extremely embarrassing to the machinery manufacturer because he can not replace the machinery or the repair part he sells without an allocation of steel and other materials, based on his customers' priority orders. We trust that with a better understanding there will be a better coöperation.

In Britain, producers must be licensed to operate at all. To obtain a license they must be engaged in essential work. The same scheme is in the making in the United States. Under such licensing conditions, while each industry is organized to look out for its "rights as an industry," the particular work a plant is engaged in is a far more important factor than the particular industry the producer happens to be in. We believe that will be the ultimate solution of the problem of priorities in this country, although at the present moment the O.P.M. is attempting to find out the minimum requirements of the industries, as industries, with the purpose in mind of using this as a factor in prorating material for the construction of machinery and supplies for these industries.

In Britain our industries have been extraordinarily busy—the cement industry particularly—in providing materials for bomb-proof shelters, repair and replacement of utilities, pavements, industrial plants, etc. Here, our industries, by and large, will continue to be busy for at least another year on new industrial plants, military and naval structures, defense housing, etc., so that even O.P.M. looks for nearly as large a construction volume as in 1941. Moreover, much of the new construction will be in the interior, where there has not been so large a demand for construction materials as in the coastal regions. Probably no American producer wants business bad enough to desire a demand for reconstruction of bombed utilities and buildings, but it is conceivable that there will be demand in the coastal regions for bomb shelters.

Labor

The labor situation is rather unpredictable. Probably there will be a shortage of labor in 1942. There have been few labor controversies in our industries, perhaps because they are relatively small enterprises. Wages are constantly going up and the quality of labor is depreciating. A midwest producer says he is in need of a new crane, but has found it impossible to buy one. The reason for a new crane, he says, is because he could not get experienced operators. The kind he has been able to get have wrecked two cranes in two months. A new ordnance plant is under construction in the vicinity and "the builders are not being too conservative with the taxpayers' money." Our correspondent continues: "Whenever a crane operator will leave a steady, year-round job to go to work watching a gasoline pump for $1.37 an hour, with no future assured, the whole structure (of society) has something lacking."

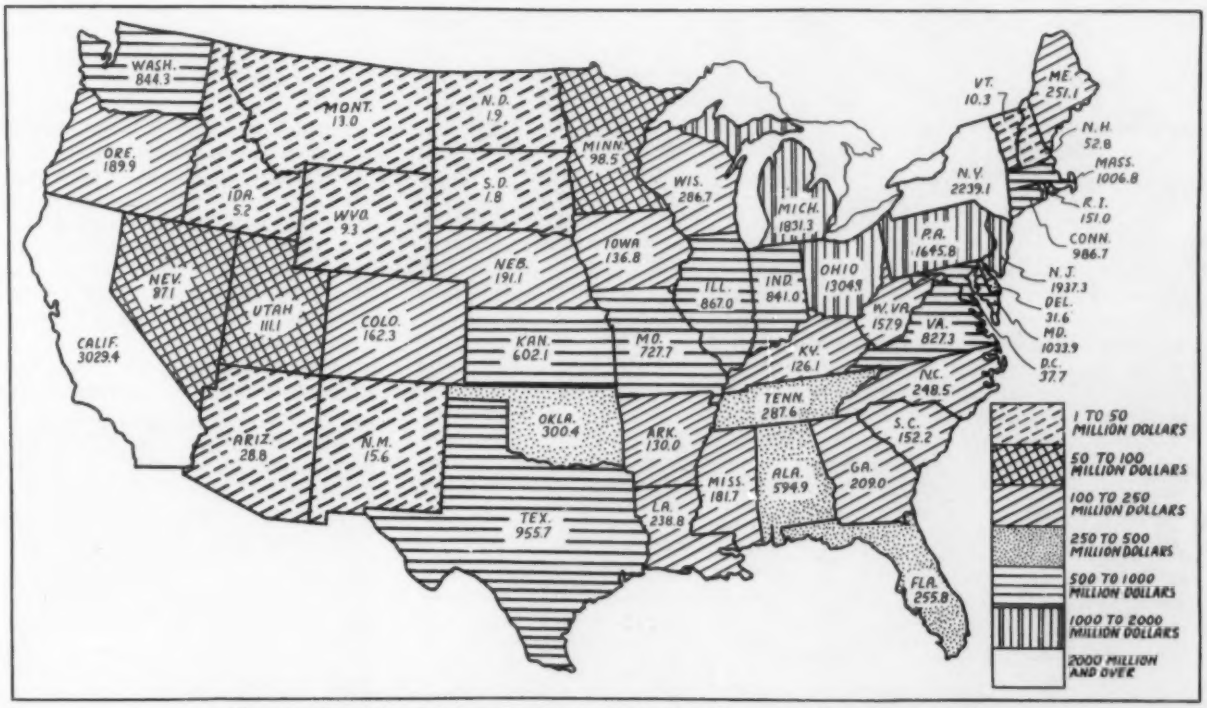
Unionization of plants is continuing, and in nearly every instance increased wages are being demanded. Even without unionization, employers in our industries are having to pay higher and higher wages. A middle east producer reports: "Since the completion of nearby defense projects, labor has become slightly more plentiful. However, with the large scale wages paid on these projects, and the rapidly increasing costs of living, it is becoming difficult to keep our rates anywhere near the usual normal schedules for this locality." Evidently this means that even after defense construction jobs are completed labor is very reluctant to return to anything like former wage scales. A few correspondents anticipate little in the way of labor problems because their employes are all old-timers and will stick. At this point we can't help reminding our readers that this is one of the dividends of a sane and fair labor policy through the years.

An eastern producer who we know has pursued a very broad-minded labor policy for many years adds proof to our reminder when he says: "The labor situation has been somewhat tight, although we have been able to carry on our work without any difficulty. Government work near our plants has caused somewhat of a labor shortage in skilled men, although we have had no trouble in maintaining our output and have been able to get enough men to take care of our work." Everywhere there is a growing shortage of skilled men and the necessity of training new men for the job. The activities of labor agitators or "dues gatherers" is generally condemned. One correspondent says tartly: "The labor situation would be peaceful and an increase in wages would be granted except for organizers' activities. We are not going to *GIVE* as long as we can be *COMPELLED*. Good men are scarce and those applying for work are generally unacquainted with physical effort and never heard of mentality." We mistrust that our friend is a little out of step with the times; and that scarcity of labor is providing only the dregs as recruits.

Whether we like it or not, it is all too obvious that organized labor is in the saddle. It very likely will ride the old mare to death, but in the meantime we shall have to go along and hope for the best. It is easy to say that the President's labor policies are weak and pointless, but we believe employers would be happier and more coöperative if they would give the President the benefit of the doubt. It may be that he is sincerely desirous of helping labor keep its social gains, so much so that he is willing to see it abuse its present privileges, or rights perhaps in his eyes, knowing that in the long run labor's excesses will be corrected by natural methods, or public opinion. In spite of unconscionable activities of some labor leaders and the advantages they are taking of the President's attitude, it may be on his part forbearance rather than fear of political consequences which leads him to head off drastic action by Congress to meet the situation by enactment of repressive legislation.

Price Outlook

While the increasing costs of equipment and supplies



Map showing federal defense contract awards by states up to November 1, 1941

and of wages have materially increased the cost of production and manufacture of rock products, if present volume continues there does not appear to be any widespread increases in prices in the picture for 1942. There is considerable evidence of rising prices for agricultural limestone, but this is the result of abnormally low pricing and appears necessary to recover costs. Crushed stone prices generally may increase a little. As in the 1917-18 world war labor scarcity seems to appear first in quarry operations.

A middle east lime and limestone producer is quoted as follows: "We point out that we are receiving approximately 35 percent less for all the products we produce than we received 15 years ago. On the other hand, our minimum wages as of January 1, 1942, will have increased 175 percent, and our average wage increase about 170 percent. From these facts alone it must be apparent to anyone why the lime and limestone industry has not enjoyed a normal degree of prosperity." This organization, incidentally, has been undergoing a thorough modernization program in an attempt to bring costs in line.

Only in the portland cement industry do producers see any prospect of a price ceiling fixed by government decree. However, as an industrial sand producer points out, if government price ceilings are fixed on steel castings, etc., it is only a question of time before these price ceilings filter down to the price of molding sand. The same may be said in the case of limestone furnace flux, lime for various industrial uses, etc. There appears to be greater prospect that competition will keep prices under such a ceiling than that the ceiling, whatever it is, will become the established price of most rock products.

Aftermath

It seems certain that those producers who cannot obtain essential defense business will be hard put to find outlets for their material, or to obtain necessary labor, operating equipment and supplies. The agitation to dispense with all possible government expenditure except for war purposes, will increase. Already state highway programs are being laid aside. We could argue our heads off that this is uneconomic, unfair to highway users who are paying enormous taxes for highway upkeep, etc. The point is that we just can't keep up this work and win the war at the same time. Little by little the W.P.A. construction activities will be dropped, public building will be postponed. Necessary public services will be maintained, sewerage, water-works, sewage disposal, etc. But an immense accumulation of this needed construction will pile up, and in the meantime many producers of rock products may have to cool their heels.

When the shooting is all over there is every expectation that all public authorities will jump into action with immense programs for public works of all kinds and in every locality. Accumulation of more debt, no matter what our debt may then be, will be no deterrent. We must and will provide work for returning soldiers and sailors as well as millions thrown out of work in war industries. Of all the industries in America the rock products construction materials industries have the most assurance of a busy war aftermath. Therefore as well as for patriotic motives let's all do our utmost to bring the war to a speedy and successful conclusion.

Nathan C. Rockwood

NEWS ABOUT PEOPLE

NORMAN E. KELB has organized Cumberland Quarries, Inc., Indianapolis, Ind., to produce the stone and stone sand to be used in the construc-

Norman E. Kelb

tion of Wolf Creek dam in southern Kentucky near the Tennessee line. Headed by Mr. Kelb as president, the officers include: C. D. Ward, vice-president; A. M. Campbell, secretary-treasurer; A. B. Johnson, general superintendent; H. H. Nagel, superintendent in charge of the quarry; and C. A. Broecker, engineer.

Mr. Kelb is widely known throughout the crushed stone industry and has taken an active interest in the affairs of the National Crushed Stone Association. He was formerly connected with the Erie Stone Co. as secretary-treasurer and general manager. Information regarding the new quarry operations will be found in the news pages of this issue.

•

EMORY M. FORD, vice-president, treasurer and director of the Huron Portland Cement Co., Detroit, Mich., has been elected president of the company, to succeed his father, the late John B. Ford. Mr. Ford, after graduating from Princeton University, went to work with the family enterprises at Wyandotte and Detroit, Mich. In addition to the position of president and treasurer of Huron Portland Cement Co., Mr. Ford holds the offices of president and treasurer of Huron Transportation Co.; vice-president and treasurer of Michigan Alkali Co.; and assistant treasurer of the J. B. Ford Co. He is also director of the above companies.

•

JOHN A. PHILBRICK, formerly secretary of the firm of John A. Philbrick and Bro., Inc., which merged in 1929 with other companies to form the General Builders' Supply Corp., New York, N. Y., was elected president of Giant Portland Cement Co., Philadelphia, Penn., succeeding Charles F. Conn, who was elected chairman of the board.

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B. J. FLYNN, formerly manager of the light works division of the Quaker Rubber Corp., Philadelphia, Penn., is now the manager of the belting division.

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SAMUEL C. HADDEN, the new chairman of the Indiana State Highway Commission, and former secretary of the Indiana Mineral Aggregates Association, has received well-deserved recognition of his close understanding of highway problems in his State. A short announcement of his appointment appeared in the December, 1941, issue of ROCK PRODUCTS, and his portrait is published this month so that others in the industry may become better acquainted with him.

Samuel C. Hadden

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JOHN A. ROBERTSON, recently head of the structural division of the National Lime Association, is now mason's supply supervisor of the United States Gypsum Co., with headquarters in Chicago, Ill. Mr. Robertson is a graduate in structural engineering of the Massachusetts Institute of Technology.

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LIEUTENANT GEORGE D. LOTT, JR., vice-president of Palmetto Quar-

Geo. D. Lott, Jr., to the right, vice-president of Palmetto Quarries Co., who is now in the Army serving as a lieutenant. He is standing next to his brother, Hamilton Lott, chief engineer of the company

ries Co., Columbia, S. C., is now stationed at Camp Davis, Holly Ridge, N. C.

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EDWARD BAUMAN, recently with the Republic Steel Co., Chicago, Ill., has been added to the staff of Dr. Wilbur Nelson, Director of Mine Priorities, OPM, to handle non-metallic minerals under P-56. Mr. Bauman was formerly materials engineer of the Tennessee Highway Department.

•

WARREN LEWIS III, son of Warren Lewis, vice-president and general manager of the Longview-Saginaw Lime Works, Birmingham, Ala., has just completed his ten weeks basic training course at the "West Point of the Air," Randolph Field, Texas. Following ten weeks at Kelly Field, he will be given his "wings."

•

WHIT PALMER, son of W. M. Palmer, president of the Dixie Lime Products Co., Ocala, Fla., has been in training in the Civilian Defense Corps at Ocala, Fla.

M. C. MILLER, engineer of the Marquette Cement Manufacturing Company's Hawkeye plant, Des Moines, Iowa, has been elected president of the Iowa section of the American Society of Civil Engineers, succeeding Mark Morris, safety and planning engineer of the Iowa state highway commission.

•

GEORGE A. MATTISON, JR., president of the Woodstock Slag Corp., Birmingham, Ala., will assume the presidency of the Chamber of Commerce, succeeding John S. Coleman. Mr. Mattison is also president of the National Slag Association and a director of the Alabama Road Builders Association

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PAUL C. VAN ZANDT, president of Universal Atlas Cement Co., Chicago, Ill., was the speaker at the Independence, Kansas Chamber of Commerce meeting on December 8.

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BERRY E. BREVICK, structural engineer for the Portland Cement Association of Milwaukee, has been elected president of the Wisconsin section of the American Civil Engineers' Society.

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C. H. CARMICHAEL, formerly plant manager, Grays Ferry Brick Co., Philadelphia, Penn., is now assistant superintendent of works, Bermuda Base Contractors, Bermuda, this latter position to be effective for a year or more.

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PAUL B. REINHOLD, who will be remembered as an active participant in activities of the National Crushed Stone Association, has been named chairman of an All-American Committee being formed to make plans for a nation-wide net-work of self-liquidating express highways to be constructed, most of them after the war

Paul Reinhold

Paul Reinhold in his Mexican regalia with his wife on a recent trip South of the border. The picture is from his Christmas card

but some of them probably will be constructed promptly now that we are at war. Mr. Reinhold is first vice-president of the American Road Builders' Association, and also a member of the Pennsylvania Turnpike Extension Committee of the Pittsburgh Chamber of Commerce. He is president of the Atlas Equipment Corporation, Pittsburgh, Penn.

"To win the war is Job No. 1 for America," said Mr. Reinhold recently. "In fact, since roads play such a primordial role in military strategy, building at least some of these superhighways may become part of America's war effort. At all events, while the American people advance to victory, we must give some thought to after-the-war economic problems which are bound to emerge."

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G. B. ARTHUR, at one time general manager of the National Lime Association, is now chief of the cement, lime and gypsum unit of the lumber and building materials branch of the O.P.M., Washington, D. C.

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JAMES B. HAYDEN was recently elected vice-president in charge of sales of the Industrial Brownhoist Corporation, Bay City, Mich.

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R. P. JONES, district material inspector for the Iowa state highway commission at Council Bluffs, has resigned to become field engineer in the soil-cement bureau of the Portland Cement Association. Andrew M. Hensing, inspector in the commission's Ames, Iowa, laboratory, has been promoted to replace him. A. S. Devries, another Ames laboratory inspector, has been named district materials inspector to replace R. H. Dinsmore, Cedar Rapids, Iowa, who died.

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F. C. FREDERICKSON, formerly secretary and manager of the Anderson Granite Co., Chicago, Ill., has been named president of the newly organized Marinette Granite Co., Marinette, Wis. The new company has leased the state quarry at Amberg.

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WILLIAM P. WITHEROW, president of Blaw-Knox Co., Pittsburgh, Penn., and chairman of the N.A.M. National Defense Committee, has been elected president of the National Association of Manufacturers for the year 1942. Mr. Witherow has been identified with the industry since his graduation from Yale in 1908, when he went with the Jones & Laughlin Steel Co. In 1913 he organized and became president of the Witherow Steel Co., which was sold to the Republic Steel Corp. At present, besides being president of the Blaw-Knox Co., he is director of the Chamber of Commerce of the United States; Blaw-Knox Co.; Sun Drug Co.; Peoples-Pittsburgh Trust Co.; First National Bank at Pittsburgh, and the Pittsburgh Coal Co. He is also a trustee of Carnegie Institute.

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BRIG. GEN. PHILIP B. FLEMING, Administrator of the Wage-Hour Law, was recently nominated by the President to head the Federal Works Agency. He succeeds Federal Works Administrator John M. Carmody who resigned because of ill health to accept the less exacting job as a member of the U. S. Maritime Commission. Many in the rock products industry will remember the General as one of the speakers at the industry annual conventions held in Cincinnati, Ohio, in 1941. Those who met him will recall his genial personality and his broad understanding of business problems. In his new work he will direct the related programs of housing, defense, public works, and road building.

•

HARLOW HARDINGE, president of Hardinge Co., Inc., York, Penn., has recently returned from a six weeks' trip, during which time he visited the mining district of Manitoba and British Columbia, Spokane, Los Angeles, Los Vegas, Salt Lake City and Butte. While in San Francisco, he attended the American Mining Congress meeting. Mr. Hardinge reports increased mine activity caused by the war effort.

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C. C. HALLVIK, materials engineer for the Idaho Bureau of Highways, has been given the additional duties of construction engineer in the reorganization of the department.

Hints and Helps

★ FOR SUPERINTENDENTS ★

Screens on Ball Mills

By WALTER LENHART

BALL MILLS used for the first stage in the raw grinding department in a recently rehabilitated California plant have been re-designed with a

Screen on discharge end of wet-grinding, ball mill designed to throw oversize back into mill

20-mesh screen affixed to the discharge of the mill. The screen is the full diameter of the mill and the assembly is so designed that the oversize is thrown back into the mill. The cement rock-mixture is ground wet.

To put on the screens, a new discharge head was designed. It was said that the improved grind and output was well worth the experiment. A light metal housing is placed over the screen end to take care of the splash.

Some Novel Uses for Rock Wool

THERE are a lot more uses for rock wool than for conventional insulation purposes, which frequently come to our attention. A newspaper clipping tells of an idea developed by a Mr. C. H. Lovell of St. Louis, by which rock wool dipped in automobile crank case drainings can be used as fuel for cooking and home heating. The wool is rolled into a wad the size of a croquet ball, tied with string and wired tightly. Then it is soaked in used oil from the family automobile and the unit is ready for use in any type coal or wood stove, fireplace or furnace.

It costs five cents or less to make a ball, and it can be burned over and over again. Tests have been made by the originator which prove that several units can cook meals and keep a house warm. The idea has been passed along to the government with the suggestion that a drive be made to save used crankcase oil and make it available to small fuel users on a cost basis.

D. B. Porter, Summit, N. J., tells of the use of rock wool for picnic excursions in an "idea" published in the August, 1941, issue of *The American Home* magazine.

He suggests filling the picnic basket with lightly fluffed rock wool to keep foods cold on hot days. If tucked in properly, even ice cubes won't melt.

Winch-Equipped Tractor Spots Quarry Cars

IN THE ILLUSTRATION may be seen a Caterpillar D7 tractor equipped with a Hyster D7N worm drive winch that has replaced a locomotive for spotting cars while they are being loaded in the Earlham quarry of Marquette Cement Manufacturing Company's Des Moines, Iowa plant. There is a considerable haul between the quarry and the cement mill, and the specially equipped tractor does the car spotting job while the locomotives confine their operations to the hauling job. The result has been a decided increase in hauling efficiency.

The tractor, which is spotted directly opposite the power shovel, is equipped with an elevated cab so the operator can see down into the empty cars. By means of the winch, having the cable attached to the end car, the operator moves the train along under the shovel a few feet at a time thus loading them evenly without overloading. The elevated tower and cab on the tractor was designed by engineers of the Marquette Cement Manufacturing Co., and was built of welded tubular sections, adequately strengthened with gusset plates at the corners.

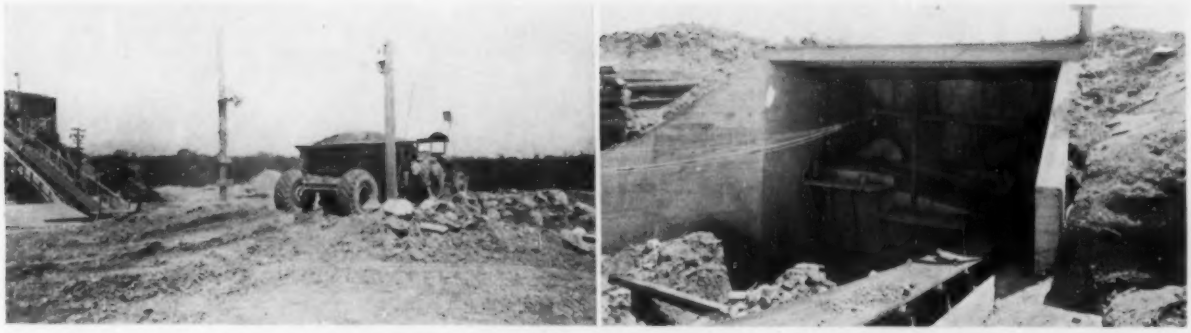
Servicing a Pump Dredge

THROUGH THE SOUTH, where many pump dredges are operated to get out sand and gravel, pontoon rafts such

Raft mounted on pontoons with outboard motor used to transport supplies, pipe, etc., to dredge

as the one shown in the illustration have been seen in operation servicing the dredges from the shore. This raft

Tractor equipped with worm-drive winch and cable spotting quarry cars into position for loading with a shovel



Left: Truck dumping sand and gravel material over grizzley and specially designed hopper. Right: Showing elongated steel hopper and feeder to transfer sticky material to belt conveyor, Becker County Sand and Gravel Co.

was photographed at the Blenheim, S. C., plant of Lawrence Stone and Gravel Co. It is used to carry out supplies, lubrication oil, etc., and is of great utility in replacing and stringing pipelines. The raft is propelled, in any direction, by an outboard motor.

Feeding Sticky Material Out of Hoppers

TO PRODUCE AGGREGATES for the construction of the Santee-Cooper Navigation Project, the Becker County Sand and Gravel Co. built a new sand and gravel plant at Cheraw, S. C. Previously a plant was operated at Lugoff, S. C., in handling similar materials.

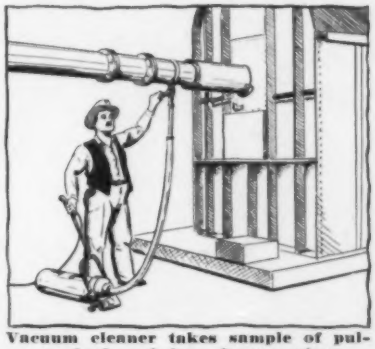
One of the difficult experiences in the first plant was to get the pit run material to feed out of a truck unloading hopper on to the primary belt, carrying it up to the screening plant. The material is sticky and tends to hang up. Haulage equipment consists of five large Euclid Traktrucks that handle 10-cu. yd. of material to the load. The difficulties of the first plant have been largely eliminated in the hopper and feeding design in the new plant. The hopper is covered with 9-in. spaced rails for a grizzley, and its long dimension is perpendicular to the belt conveyor carrying material from it, that is, paralleling the length of a truck as it discharges material into the hopper.

This hopper has a surge capacity of 28-cu. yd. and material from it is fed out to the 36-in. belt conveyor, 300-ft. centers, over a 3½- x 9-ft. Link-Belt reciprocating feeder. The feeder also parallels the hopper, below, and is perpendicular to the belt conveyor. This arrangement permits ready emptying of each truck into a hopper of more than ample capacity while maintaining steep hopper sides which are essential to make this material flow out. The feeder has a downward slope of 1-in. to the foot in its direction of travel toward the conveyor belt.

Taking Samples of Pulverized Coal

AN ordinary house vacuum cleaner is used to sample pulverized coal fired in rotary cement kilns in an Eastern plant. This plant has direct-firing ball mills. It was decided that the most representative sample should be taken near the point of entrance to the kiln.

Within a few feet of the kiln hood, a pipe fitting and valve were connected into each burner pipe. The



Vacuum cleaner takes sample of pulverized coal from burner pipe

fitting has a ¾-in. inside diameter through which a hollow rod can be inserted vertically up into the coal mill stream. A hose leads from the rod to a Hoover vacuum cleaner and a sample is drawn out for fineness tests. The rod is held to draw off coal at several locations within the stream to get an average representative sample. Samples are taken once a day.

Iron Locator

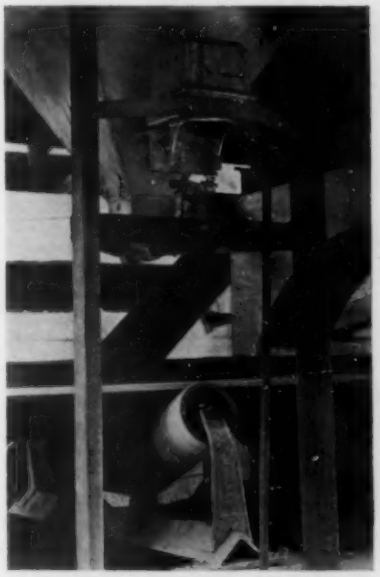
By WALTER B. LENHART

WHERE A BELT CONVEYOR of large capacity operates at high speeds and with a deep bed of material on the belt, it is often difficult to get a magnet close enough, to any tramp iron that might be on the belt, to lift out the iron.

At the sand and gravel plant at Shasta dam, where many units of belt conveyors carry pit material to the washing plant, a novel device has been worked out to protect the crusher (and other machinery items) from tramp iron. Mounted over the belt near the loading point is a hopper containing a white powder (any white material such as lime, gypsum, white limestone, etc., will do). The outlet to this hopper is actuated by a special gate. A short distance from the hopper is mounted a magnetic device, which when any tramp iron passes into the magnetic field, sets up currents that stops the belt. At the same instant, the gate on the hopper opens and lets some of the white powder fall on the belt.

Thus the white powder marks the place on the belt conveyor where the tramp iron is buried in the muck, and the operators can then find it easily.

This device should have a number of applications in the rock products field where space limitations prevent the use of commercial equipment.



Small magnet which stops belt and actuates gate of hopper containing white powder

NATIONAL ASSOCIATION ACTIVITIES

Industrial Sand

EXECUTIVE SECRETARY V. P. AHEARN of the National Industrial Sand Association and the National Sand and Gravel Association recently sent a letter to these association members calling attention to the recent steel plate allocation order of SPAB. Mr. Ahearn asked that the members cooperate helpfully with the associations' officers in promptly filling out and returning a questionnaire prepared by Dr. Nelson of the Office of the Administrator of Mine Priorities which will help determine the amount of steel which will be allocated to the industry. A recent steel plate allocation order provided that after December 1, no person shall produce, deliver or accept plates except pursuant to orders of the Director of Priorities. Steel plate under the allocation order is defined as "Flat carbon or alloy steel products (other than slabs) over 6-in. wide and ¼-in. or more thick; or over 6 in. wide and weighing 10.2 lb. or more per square foot; or over 48 in. wide and 3/16 in. or more thick; or over 48 in. wide and weighing 7.65 lb. or more per square foot."

Better Industrial Exhibits

A PRIMER FOR INDUSTRIAL EXHIBITORS is the title of an interesting spiral-bound 63-page booklet prepared by the Association of National Advertisers, Inc., New York, N. Y. It has been prepared as a guide to more effective and profitable participation in trade shows, exhibits, and expositions. Chapters have been prepared on selecting the right shows, selecting the exhibit space, planning the exhibit, shipping and setting up the exhibit, operating the exhibit, dismantling the exhibit, following up the show, and other important subjects.

Crushed Stone

ADMINISTRATIVE DIRECTOR J. R. BOYD of the National Crushed Stone Association recently sent out a letter to the membership requesting the coöperation of the industry in answering a questionnaire which will supply information governing SPAB's policy of allocation of critical materials. This questionnaire has been prepared by Dr. Nelson of the Office of the Administrator of Mine Priorities for the purpose of developing information concerning the prospective use in 1942 of critical materials by the industries which come under P-56. The information will include not only critical materials needed for maintenance and repair, but also for finished machines used as replacements or for expanded production in accord with recent amendments to P-56.

Fellowships Granted by National Lime Association

ANNOUNCEMENT has been made that the National Lime Association has added two fellowships at the National Bureau of Standards, according to K. L. Hammond, chairman of the board of directors of the Association, and secretary, Keystone Lime Works, Keystone, Ala. Money has been appropriated for the study of Lime in Chemical Processing at the Arthur D. Little Co., a subsidiary of Massachusetts Institute of Technology, Cambridge, Mass.

Ready Mix Specifications

ANNOUNCEMENT has been made by Stanton Walker, director of engineering for the National Ready Mixed Concrete Association, that copies of the Tentative Specifications for Ready Mixed Concrete as adopted by the American Society for Testing Materials at its June, 1941, meeting are now off the press. This tentative specification has been prepared as a revision of the current standard specifications (Serial Designation No. C 94-38).

COMING CONVENTIONS

American Concrete Institute, Palmer House, Chicago, Ill., February 17 to 20, 1942.

American Concrete Pipe Association, Roosevelt Hotel, New Orleans, La., February 23 and 24, 1942.

National Crushed Stone Association, Netherland Plaza Hotel, Cincinnati, Ohio, February 2 to 4, 1942.

National Lime Association, The Homestead, Hot Springs, Va., May 26 to 28, 1942.

National Ready-Mixed Concrete Association, Netherland Plaza Hotel, Cincinnati, Ohio, January 28 to 30, 1942.

National Sand and Gravel Association, Netherland Plaza Hotel, Cincinnati, Ohio, January 28 to 30, 1942.

Sand and Gravel

APPARENTLY the Seamen's exemption question affecting dredge operators has finally been closed. Executive Secretary Ahearn, of the National Sand and Gravel Association, advises that Baird Snyder, Acting Administrator, Wage and Hour Division, has agreed to the proposal to waive retroactive enforcement of the law if individual members of the industry agreed thereafter to comply. Those members of the industry who are affected and who have decided to accept Mr. Snyder's offer of future compliance should write promptly to the Administrator of the Wage and Hour Division, advising of that acceptance. Exemption of seamen applies without question to employes on towboats and tugboats as well as barge captains, but until such time as the administrator may rule in individual cases that the seamen exemption applies, the remaining classification of employes on dredges and other floating equipment will hereafter be brought under the law when engaged in producing materials for interstate commerce, effective November 25, 1941.

Concrete Institute Convention

AMERICAN CONCRETE INSTITUTE has announced that the annual convention of the institute will be held at the Palmer House in Chicago, February 17 to 20, 1942. Technical committee meetings will be held February 17, and general sessions will be held during the rest of the week. The annual dinner will be held Thursday evening, February 19.

Several papers have been prepared on the subject of the expansive reaction between aggregate and high-alkali cement. Of interest to concrete product manufacturers will be a paper on masonry wall construction and another paper on the use of cast stone facings on concrete structures, describing the experience of the Navy.

Cement Standards

THE 1941 EDITION of the American Society for Testing Materials "Standards on Cement" is now available at $1 per copy. It contains the official text of the new standard specifications for portland cement in five varieties, still termed Types I to V.

Progress in Processing Under Priority Controls

✦

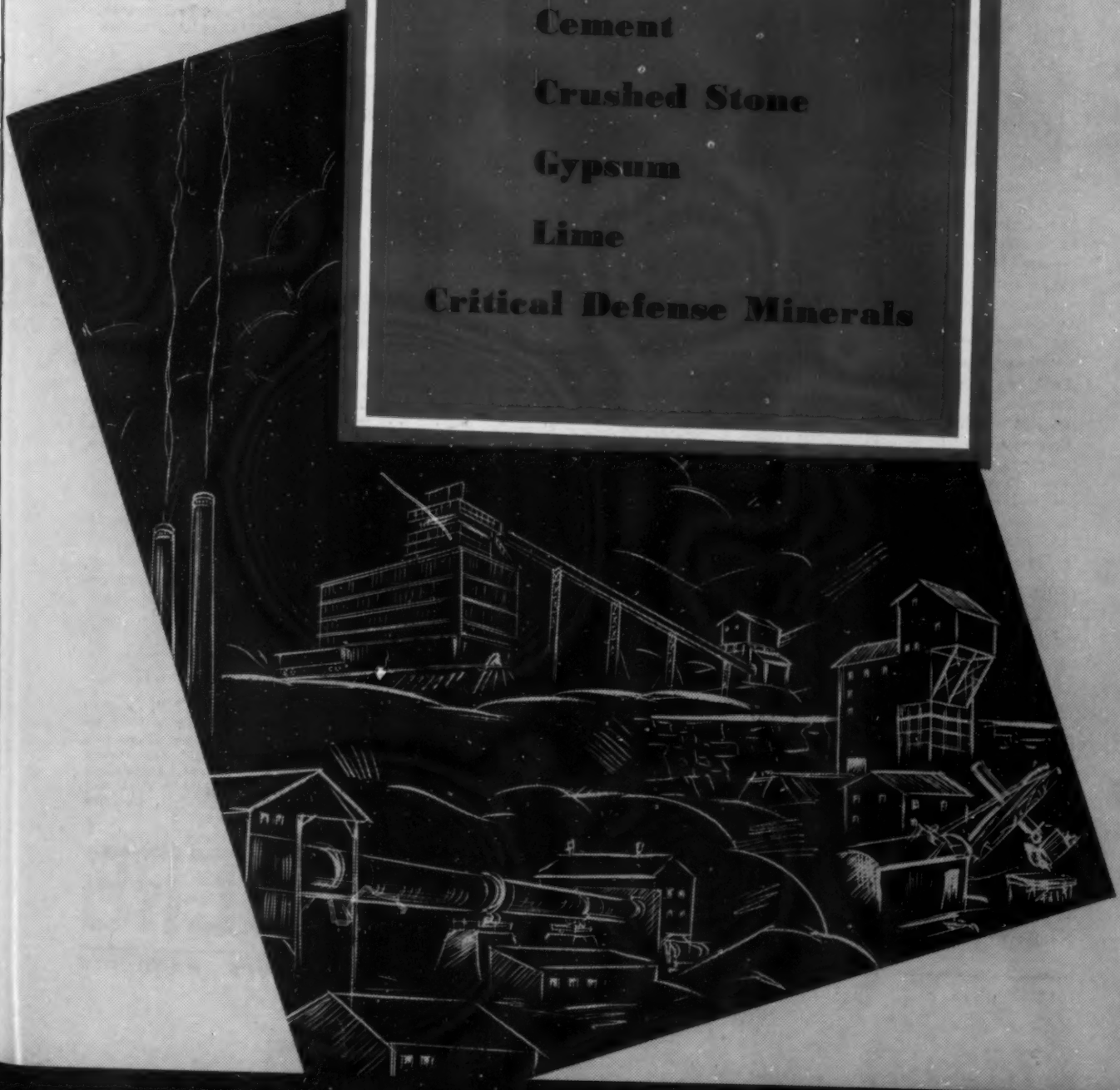
Cement

Crushed Stone

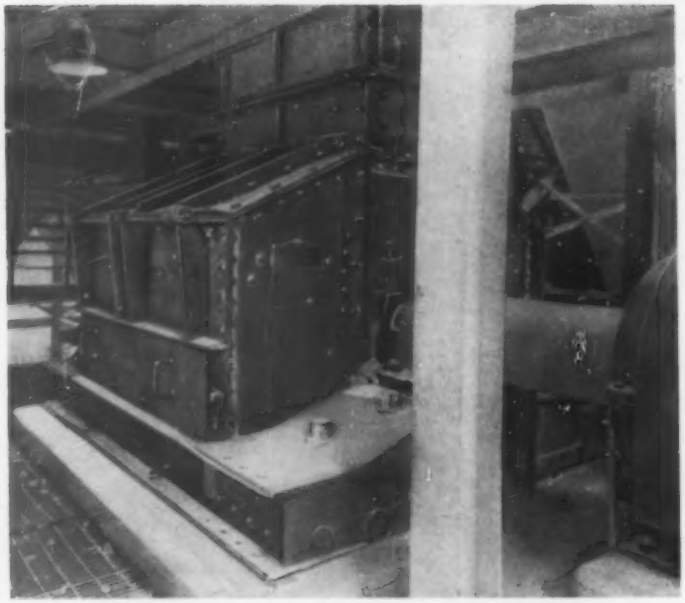
Gypsum

Lime

Critical Defense Minerals



"PENNSYLVANIA"



"PENNSYLVANIA"
REVERSIBLE
HAMMERMILLS

"Pennsylvania" REVERSIBLE Hammermills, with High Drop, Central Feed, do major crushing by smashing head-on impact between the Hammer Faces and imperforate Anvils,—and finish the sizing over Duplex adjustable cages,—in alternate RIGHT and LEFT HAND operation,—on Cement Making Materials, Limestone, Lime and Gypsum.

This advanced crushing technique affords,—

AUTOMATIC HAMMER TURNING

●

AUTOMATIC HAMMER AND CAGE BAR RESHARPENING

●

INCREASED CAPACITY PER FRAME SIZE

●

FINENESS AND UNIFORMITY WHICH INCREASES GRINDING EFFICIENCY

●

SHARPLY CUT UPKEEP COST AND REDUCED POWER DEMAND

Complete Raw Side Crushing Equipment

Put Your Reduction Problems up to "Pennsylvania" Engineers

Representatives in Principal Centers

PENNSYLVANIA CRUSHER COMPANY

Associated with Fraser & Chalmers Engr. Wks., London

General Offices: Liberty Trust Bldg., Philadelphia

"PENNSYLVANIA" REVERSIBLE IMPACTOR preparing abrasive cement making materials by impact crushing, for grinding mills in modern Western Plant. Other services include impact reduction of Ores, Refractories, fluxing Minerals, Road Chips, Aggregates, Gravel, etc. Patented. Bulletin 6000.

"Pennsylvania" High Drop Central Feed REVERSIBLE Hammermill, operating Monday RIGHT HAND,—Tuesday LEFT HAND,—for fine preparation of cement making materials, for efficient grinding,—in closed circuit with Vibrating Screen. Patented in U. S. and Canada. Bulletin 1030.

SUPER-PENNSTEEL Series Single Roll Crusher for Primary and Secondary reductions of Fluxing Stone, Cement Making Materials, Iron Ores and Gypsum Rock. One piece Steel Frame, double Safety Protection against Tramp Iron, low Upkeep Cost and unfailing Dependability. Patented. Bulletin 2004.

STEELBUILT CRUSHERS

Possible Special Products

Careful study of deposits may reveal important and profitable sources of products which may help to supply shortages caused by the war

By NATHAN C. ROCKWOOD

HITHERTO we have thought of quarry products as cement, lime, crushed stone, etc. We have got to enlarge our outlook. With the development of processing dolomite for high magnesia refractories, for recovery of magnesium, etc., we face a new consuming market of unknown extent for the output of dolomite quarries. With processing of limestone to eliminate impurities we foresee many new uses for limestone products. We have already one producer of the metal calcium on a commercial scale—the Union Carbide Co.

Metal Calcium

The Electro Metallurgical Co., an affiliate of the Union Carbide Co., has been producing the metal calcium at Sault Ste. Marie, Mich., since 1940 in a thoroughly modern plant. The process uses the electrolysis of calcium chloride. Hitherto the metal calcium was obtainable only from France and Germany. Suffice to say that many metallurgical uses are known and that the metal calcium bids fair to become a very important metallurgical alloy essential. The present base cost is about $1.25 a pound. The industry is starting much as the magnesium industry started. At some future time it is entirely within the range of possibilities that lime or limestone will be the starting point, as calcium chloride is today, for the production of the metal calcium.

Rare Earths, Etc.

Few quarrymen worry very much about the chemical or mineralogical characters of the rocks they quarry; nor do sand and gravel producers. Yet by not too complicated processing some valuable by-products may sometime be recovered. For example, in the flotation of limestone to remove mineral not wanted in portland cement manufacture, a marketable pulverized mica is recovered at the Valley Forge Cement Co. plant. Kaolin processing plants in North Carolina also produce marketable fine mica as a by-product.

It seems to us that if we were producing or recovering rock dust of any kind we would have a thoroughgoing chemical analysis made to see if some rare earth product were not present, which it might pay to recover. Some of these are monazite, lanthanum, cerium, praseodymium, neodymium, europium. With the development of modern industrial chemistry, uses are being found for nearly everything in nature. The waste from sand and gravel plants may contain rare minerals such as mica, graphite, gold, platinum, etc.

New Lime Products

We have referred in the December issue (and previously) to so-called synthetic magnesite made by treating dolomitic lime with brine or sea water. From magnesite new magnesium oxides are being produced, which have very active properties and are finding an expanding use in many processing industries. It is known that high calcium lime, or calcium oxide, made under similar controlled conditions, and of a pure raw material, also has unique properties. This may entirely revise the picture of lime in the processing industries.

For example, we know that at least one lime manufacturer has been selling a light burned dolomitic lime for de-acidifying drinking water—a use that came to us from Germany, before all communications ceased. For this purpose, according to the U. S. Bureau of Mines, dolomite is subjected to a controlled calcination, and a porous product consisting mainly of magnesium oxide and calcium carbonate results. This product, used in filters, reacts with the free carbon dioxide in the water to form soluable bicarbonates, which increases the carbonate hardness of the water but renders it noncorrosive. Water treated with this new lime product not only loses its corrosive properties but also is capable of depositing a thin protective coating on iron pipe that already has begun to corrode. The rust absorbs the free carbon dioxide, thus disturbing the balance between the carbon dioxide and the calcium carbonate causing it to settle on the rust, which produces a protective coating.

For construction purposes, at least one lime manufacturer has placed on the market a magnesium or dolomitic lime containing less than 8 percent of unhydrated magnesia and lime (new Federal specification). It is said this material is ready for use within 20 minutes after mixing with water. A much higher degree of control is required in the manufacturing process, for there is not one but several kinds of hydrated magnesia.

These new magnesium and calcium oxides and hydroxides (or hydrates) have great affinity for silica, alumina, sulphur, etc., and therefore may have special uses in metallurgy as well as in other chemical processing operations. In this metallurgical field, soda ash is finding a new application, but of course lime is essential to the manufacture of soda ash. The precipitated calcium carbonate sludge, one of the end products, may now be purified by froth flotation or otherwise, and marketed for the manufacture of very fine glass. Similarly, the market for magnesite (magnesium carbonate) is increasing in the metallurgical industry because of the possibility of using a magnesite refractory for open-hearth roofs, by means of new methods of construction.

Marbles and Limestones

With the extinction of trade with Italy, there is increased demand for terrazzo chips from American quarries. By search and selective quarrying probably all color shades can be found here. The reason Italian terrazzo chips have been preferred is partly because this source has long been used and colors standardized, and because terrazzo contractors are usually Italian. Production of terrazzo chips is usually done by crushing and screening plants designed for production of chicken and poultry grits. The latest in this line to come to our notice is from a Texas marble producer who is asked to give an exclusive contract to an agency to market his white marble dust as "canary bird grit." Maybe this is another limestone product that has been imported at high cost under a fancy name!

Portland cement manufacturers are now quite well aware that an impure limestone can be beneficiated,

or have its calcium carbonate content raised, by froth flotation either to float off the limestone concentrate, or remove the limestone impurities by floating these off. Limestone quarry operators and lime manufacturers apparently have given the possibilities thus provided very little thought in connection with the production of other limestone products. However, the U. S. Bureau of Mines has made experiments with low grade limestones in the Willamette Valley of Oregon, and concludes that by flotation the calcium carbonate content may be raised to 85 percent and thus provide a suitable material for agricultural limestone.

Obviously, by the same processing limestones could be conditioned to provide satisfactory raw material for chemical lime of high purity, hydraulic lime and natural cements of any desired composition. So far as known no commercial application has been made of the froth flotation process to the beneficiation of gypsum, although it has been proved entirely feasible. Doubtless there are many possible new uses for gypsum products of high purity, that would thus be opened up.

Use of Lime in Getting Magnesium from Sea Water*

OYSTER SHELLS, received at the plant by barge, are unloaded over a poidometer belt to primary storage. The shells are put through a rotary screen washer to remove soil and are then conveyed as required to principal storage or to the 300-ft. rotary kiln where they are burned to lime. Since the shells are particularly pure calcium carbonate, the product of the kilns is high purity calcium oxide. The burned lime is fed direct from the kilns to rotary slakers from which it emerges as a thick slurry of milk of lime.

The lime slurry from the hydrators is piped to a 150-ft. Dorr thickener in which it is dewatered to a thick sludge. The overflow of the thickener returns to the slakers. The thickened lime sludge, drawn from the bottom of the thickener, is fed into six launders in the surface of a flocculating tank where it meets the incoming sea water.

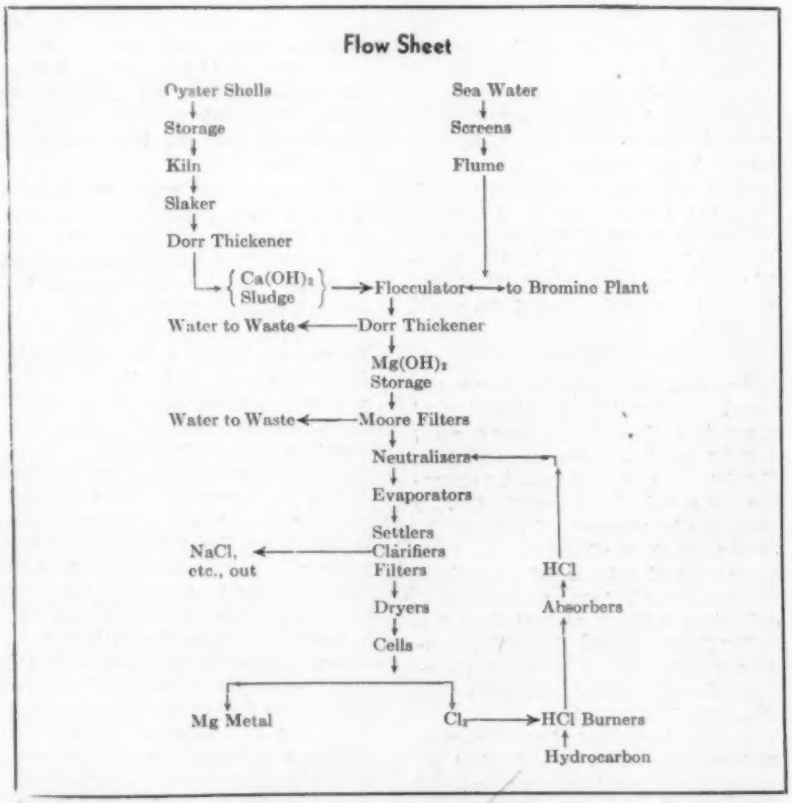
In the flocculator, magnesium hydroxide is precipitated. Addition of lime slurry brings the pH of the solution to about 11.0. This operation is controlled by a Leeds & Northrup recording pH meter and by check titrations made at frequent intervals. The underflow from the flocculator goes to four 200-ft. Dorr thickeners operating in parallel, where the magnesium hydroxide sludge is separated from the bulk of the spent sea water. The overflow from these Dorr thickeners goes to waste with other plant effluents through a drainage canal into the present stream of the Brazos river. The river empties into the Gulf of Mexico some seven miles south of the entrance to the ship channel from which the raw sea water is drawn.

The magnesium hydroxide slurry is then pumped to a series of Moore-type, leaf filters in which further dewatering takes place. These filters consist of 12 units, each about 90 ft. long and composed of 100 cloth-covered leaves. The units are immersed in tanks containing the slurry, and vacuum is applied inside the leaves to build up a cake of magnesium hydroxide. When a sufficient cake is formed, the unit is lifted from the slurry tank by an overhead traveling crane, moved over a duplicate sludge tank, and the cake blown off by air pressure applied inside the leaves.

The thick sludge from the Moore filters is pumped to the rubber-lined mixers and crude hydrochloride acid is added to form magnesium chloride solution. The neutralized solution is pumped to settling tanks and thence to spray evaporators where it goes through an initial concentration. These evaporators are direct gas-fired and consist of three parts—a brick-lined fire chamber, a brick-lined intermediate tower, and an atmospheric condenser. The concentrated solution (it is not completely dried) from the evaporators is strong enough to precipitate sodium chloride and other solids.

The filtered magnesium chloride solution then goes to the shelf dryers. These units (50 ft. in diameter by 50 ft. high) are direct gas-fired and consist of a dozen shelves over which the magnesium chloride is raked during the drying operation. Their operation is similar to that of a Herreshoff furnace. The feed to the dryers is solid magnesium chloride in sufficient

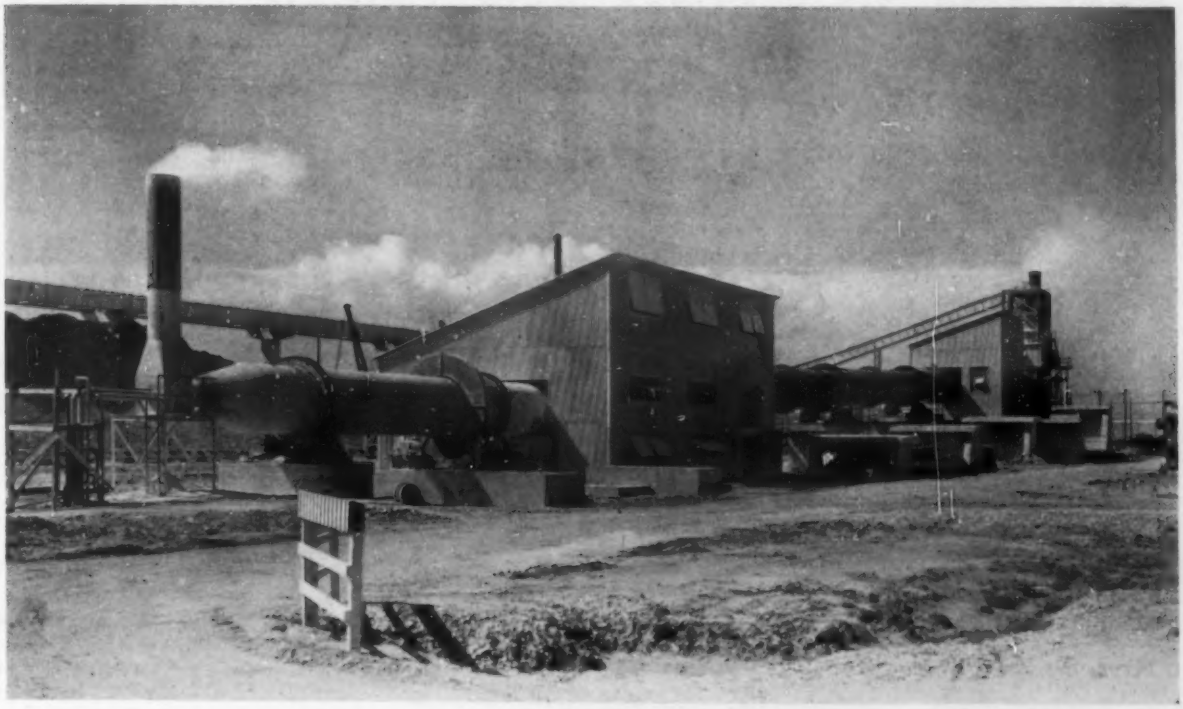
(Continued on page 102)



Flow sheet of the Dow Chemical Co.'s magnesium plant, Freeport, Texas, showing part played by lime in the process

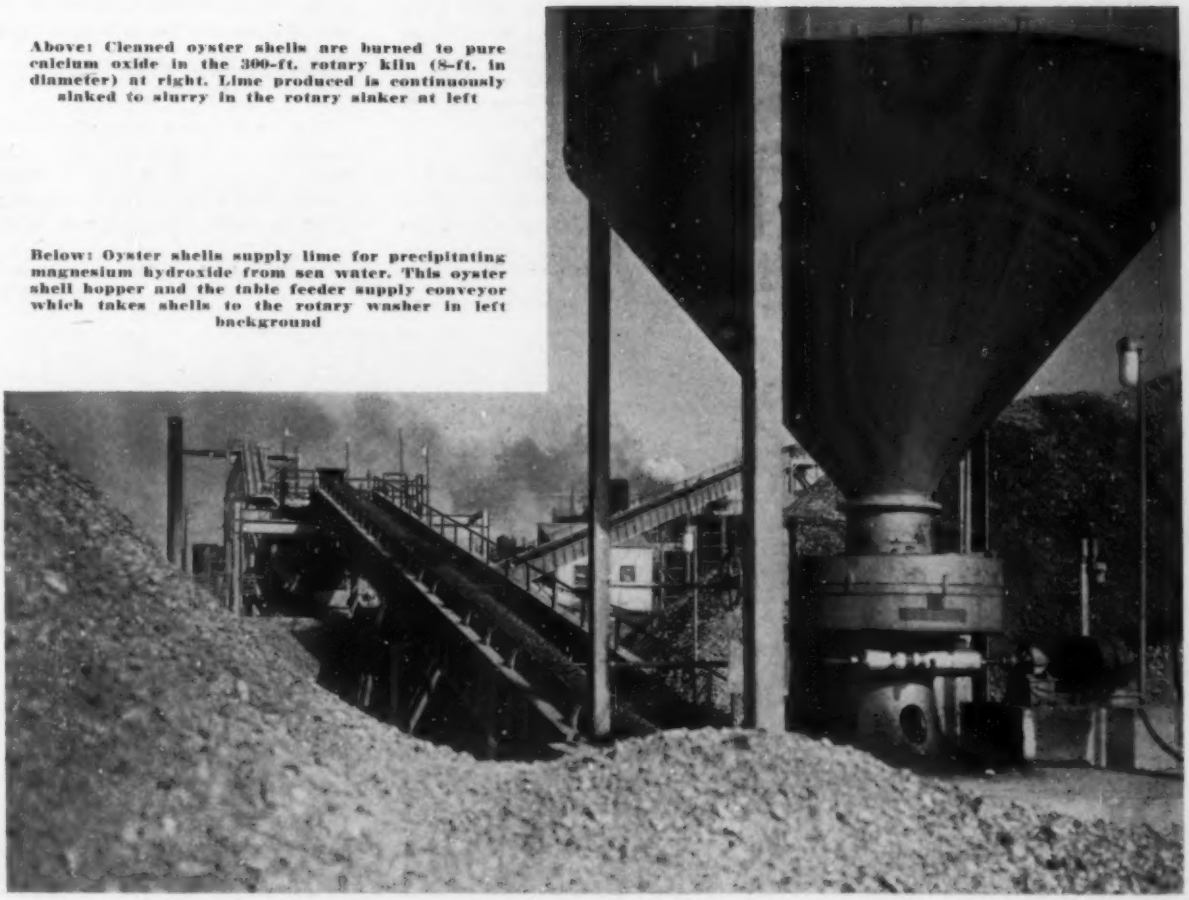
*Reprinted by permission of **Industrial and Engineering Chemistry**, of the American Chemical Society, and the Dow Chemical Co.

Magnesium from Sea Water at Freeport, Tex., Dow Chemical Co.



Above: Cleaned oyster shells are burned to pure calcium oxide in the 300-ft. rotary kiln (8-ft. in diameter) at right. Lime produced is continuously slaked to slurry in the rotary slaker at left

Below: Oyster shells supply lime for precipitating magnesium hydroxide from sea water. This oyster shell hopper and the table feeder supply conveyor which takes shells to the rotary washer in left background



Blend Cement Raw Materials To Control Chemical

OUTSTANDING in the proportioning of cement raw materials is the process developed by the Marquette Cement Manufacturing Co. at Cape Girardeau, Mo., to control chemical composition. Each separate raw material is blended by recirculation through a series of bins, carried to the point where samples from a given batch will show practically identical chemical analyses.

More exacting cement specifications, and a trend toward closer limits in chemical composition were factors in building an entirely new raw material department. Special cements were also a consideration that made it necessary to arrive at an accurate means of raw mix composition, in dealing with materials that vary widely.

Marquette's plant at Cape Girardeau is dry process. Standard portland cement, high early strength portland and a modified, low heat cement are manufactured. Five raw materials go into the making of the various cements — limestone, clay, diaspore, iron cinders and sand. The main difficulty in arriving at a holding point, chemically, by the old approximate method of mixing and proportioning was due to the wide variations in the clay and the diaspore. Iron cinders vary to a lesser degree and so does the limestone. Silica, from an outside source, is nearly uniform but is used only in making modified cements.

Silica content of the clay ranges from 48 percent to as high as 65 percent, when diaspore is required. Alumina, in the clay, runs from 14 to 20 percent which is never too high. Limestone, as quarried for cement manufacture, ranges from 48 to 53 percent CaO and the iron cinders are 75 to 80 percent Fe_2O_3. It may be readily seen, from these figures, that uniformity, chemically, of kiln feed material is difficult to attain.

This blending process was decided upon, after considerable research, as a process that would rival the accuracy of control in wet process plants. Since 1939, the principal offenders—clay and diaspore—have been treated in that way, with very favorable results. Iron cinders and sand are being similarly processed. The overall system is by no means completed yet, but it will embrace as complete a treatment for the limestone before it is finished.

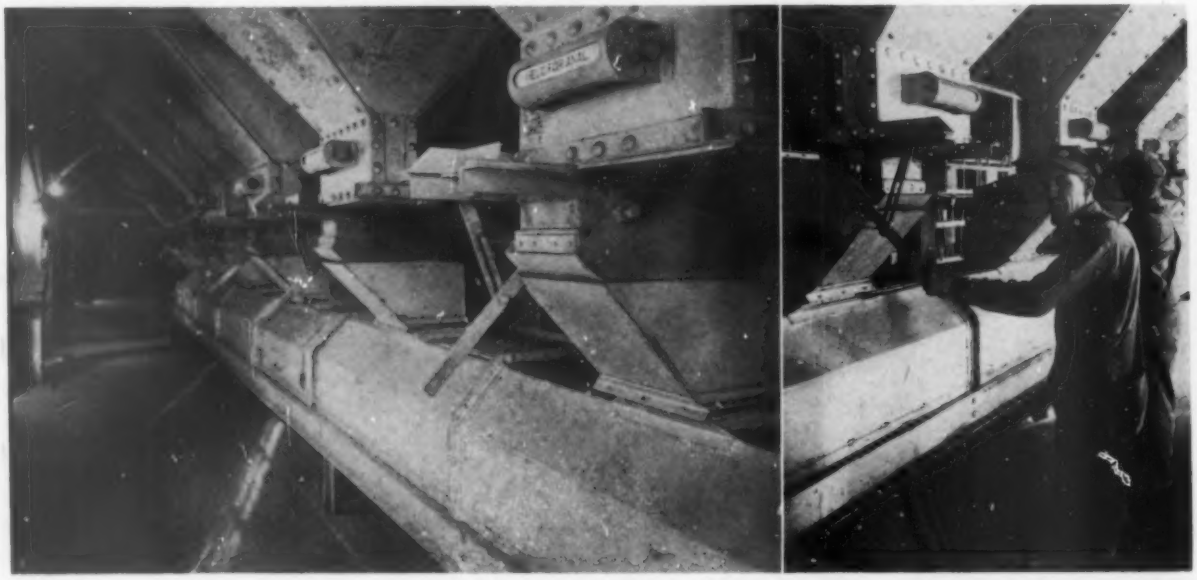
When ultimately completed, each material will separately be brought to a *uniform* chemical composition, whatever it be, before it will be released to proportioning scales. Each material will be processed in batches equal to a 24-hr. requirement, thus making it possible for the chemist to have a complete analysis of the raw materials one day ahead of the use of any particular batch. Once having established a definite chemical composition for each material, each will be weighed on separate scales to arrive at the mix chemical composition required for any of the cements.

This procedure is already established except that the limestone equipment remains to be perfected. In the meanwhile, continuous samples of the limestone are taken during the grinding process. Hourly titrations are made to determine the carbonate content and adjustments are made on the proportioning scales when needed. All the other materials must be analyzed and approved by the chemist *before* release for grinding. Formerly, test results were not completed until the material was already ground.

Preliminary Treatment of Materials

Clay, as it comes from pits in the Mississippi river bottoms three miles from the plant, is highly variable. One carload might be light in color, denoting high silica content, while

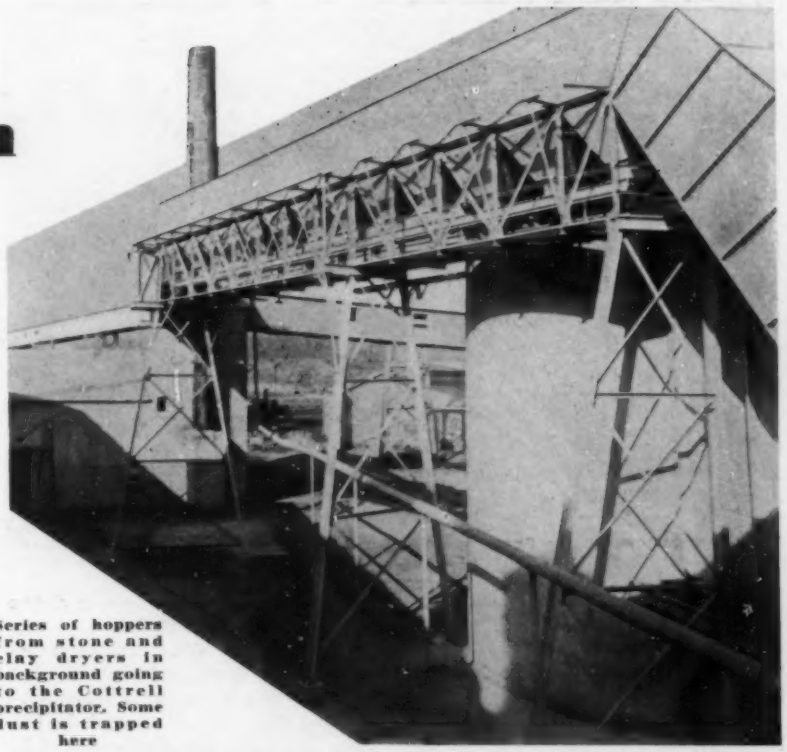
Left: Six of seven analysis tanks in which diaspore, iron cinders and silica sand are stored after blending. They are released by chemist after analysis to weighing scales. Right: Demonstrating how materials are released for weighing. Note batch numbering system and identifying cards, above



By BROR NORDBERG

Composition

Each raw material is blended by recirculation through a series of bins, carried to the point where samples from a batch show practically identical chemical analysis



Series of hoppers from stone and clay dryers in background going to the Cottrell precipitator. Some dust is trapped here

one high in alumina will appear almost black.

Clay is unloaded from cars into a plant hopper, to start its cycle. It is first put through a pug mill, and then a set of Traylor rolls in preparation for drying. One of the rolls is 30-in. diameter turning at 4 r.p.m. and the other, 20-in. diameter, is fitted with cutters and turns at 375 r.p.m. A continuous stream of flue dust, pumped into a nearby hopper by a 4-in. Fuller-Kinyon pump feeds between the rolls to keep the clay from sticking to them.

The clay is fed into a 7- x 90-ft. coal-fired Vulcan rotary dryer, and the dried clay is elevated to a screw conveyor feeding into either of two 240-ton hopper-bottomed receiving tanks. These two tanks are the beginning of the blending process, and each has a capacity sufficient for peak 24-hr. operation. While one is being filled, the other is participating in the blending operation. Each batch of 240 tons is assigned a number for identification in the chemist's records.

Blend Clay Three Times

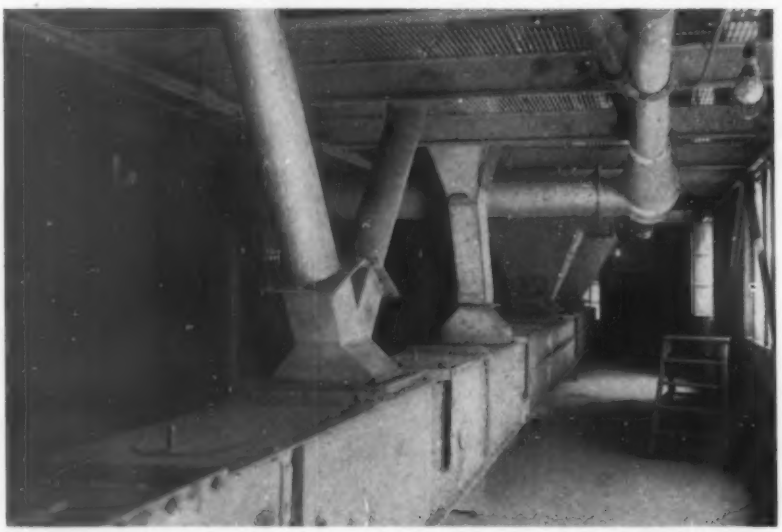
After one of the receiving tanks is filled, the clay is ready for blending. Clay is withdrawn on to a 16-in. drag-conveyor and elevated to a screw conveyor which fills each of four tanks in sequence. Combined, the four hold the equivalent of one receiving tank. When full, the clay is withdrawn uniformly and simultaneously from all four tanks on to a 15-in. double-deck drag conveyor and is returned into the same receiving tank by the same bucket elevator that handles clay from the dryer. The process is then repeated. Blending is completed after the clay has been withdrawn from the four tanks three times. At the third withdrawal, the same elevator transfers the clay to another 16-in. screw conveyor which fills either of two 240-ton "analysis" tanks. When filled, the complete batch of clay is held in either analysis bin until an analysis of its contents is made and the chemist releases the batch for proportioning with the other raw materials.

Bottom of one of the two 240-ton clay receiving tanks. Note that this unit is marked "Receiving from Dryer." The conveyor is followed by a bucket elevator to the four blending tanks

Automatic Sampling

Samples are taken at the elevator spout where the transfer is made to the screw conveyor filling the analysis bins. The sampling is automatic. A split chute in the spout is equipped with a revolving gate that is electrically-timed to cut a complete cross-section out of the clay stream, into a spout leading to the sampling hopper. Timing of the revolving gate may be varied according to the number and size of samples desired.

Generally, the motor-driven gate



Drag conveyor under the five proportioning scales to carry batched materials to grinding mill bin

CLAY BLENDING

		Before (percent)		After (percent)
SiO_2	1.	53.65	1.	56.04
	2.	54.42	2.	55.84
	3.	57.42	3.	56.06
	4.	58.26	4.	55.80
			5.	56.08
			6.	56.02
			7.	55.68
			8.	56.17
	Average	55.94		55.96
Al_2O_3	1.	21.96	1.	22.40
	2.	22.12	2.	22.46
	3.	23.00	3.	22.42
	4.	22.00	4.	22.36
			5.	22.44
			6.	22.24
			7.	22.36
			8.	22.20
	Average	22.27		22.36
Fe_2O_3	1.	3.04	1.	3.08
	2.	3.20	2.	3.08
	3.	2.96	3.	3.04
	4.	3.04	4.	3.04
			5.	3.12
			6.	3.12
			7.	3.08
			8.	3.08
	Average	3.06		3.08

turns twice a minute and continues to take a cross-section of the clay during the approximate two hours needed to transfer the entire 240-ton batch to the analysis tank.

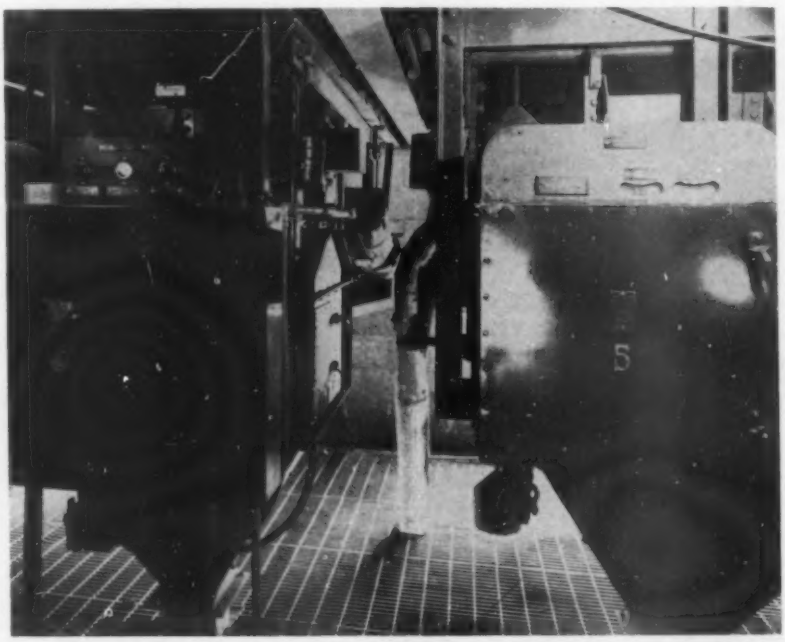
A Jeffrey-Traylor vibrating feeder puts the clay from the hopper into a No. 1 Williams hammer mill in a continuous stream for reduction to finenesses desired for testing. The hammer mill product is discharged over a magnetic separator into a riffler, which is made up of a series of divisor boxes inside a dust-tight housing. About 25-lb. of the clay is diverted, by the riffler into a sample can for analysis and the remainder is returned into the main bucket elevator. The entire batch of 240-tons of clay is then held in the analysis bin until the chemist makes his report and releases, or rejects, the batch.

To date not one batch has been rejected, since accurate analysis of each raw material plus exact proportioning has made it possible to maintain the chemical holding points. However, should a batch be too far out of line, it can be withdrawn from the analysis bin to join the clay coming from the dryer in the elevator feeding the receiving tanks.

That blending is an answer to the problem of nonuniform raw materials is shown by the following tables of analyses, which were taken from test records. Figures in the column "before" were from samples of the clay taken as it came from the dryer. In the column "after," samples were taken as described, after three withdrawals from the four tanks. In other tests, blending carried beyond three withdrawals, showed no particular advantage in carrying the procedure further.

An analysis of the figures shows that the maximum deviation of any of the tests for SiO_2 from the average was 0.28 percent for blended clay. Corresponding figure for unblended clay was 2.32 percent. In the tests for Al_2O_3 the figures are 0.16 compared to 0.73 and, for Fe_2O_3, 0.04 compared to 0.14.

After a batch of clay has been approved, it is withdrawn from its analysis bin and conveyed into a scale bin for proportioning and blending with the other raw materials that go into the manufacture of cement. Complete records are kept on the analysis of each batch for the purposes of computing mixes, and every batch is numbered in sequence as it goes through the process. Every bin involved has electric level indicators which cause sirens to blow and lights to flash on to let the operator know that it is empty or full. In addition, the receiving and analysis bins each have an adjustable chart to tell the operators at a glance what the status of that bin is at any time. On the re-



Looking at front of proportioning scales, five units handling five separate materials

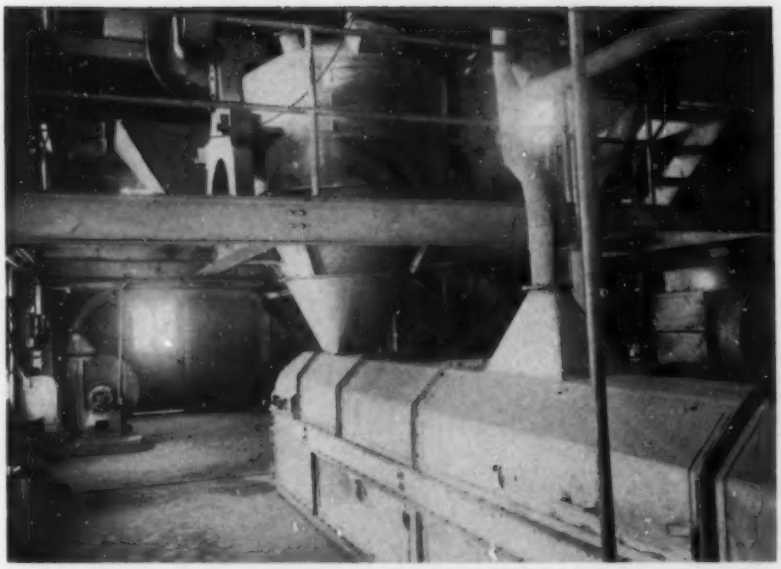
ceiving bins, the chart will show "Receiving from Dryer," "Full." "Transferring to the Four Cells," "Receiving from the Cells" or "Empty." On the analysis bins, the chart will show "Receiving from the Cells," "Full," "Held for Analysis," "Releasing" or "Reject." Every time the bin is changed the chart is changed accordingly. Any of the bins involved must be completely emptied before receiving more material.

Diaspore and Iron

Just as accurate control is exercised over the diaspore, iron, and sand by the same process, but it is on a smaller scale. Each are processed separately through the same equipment but have separate analysis tanks. Capacities are designed to prepare, in one day, enough of each material to last for three days' operation.

Diaspore and iron cinders are stockpiled at the plant and are fed into a hopper by an American locomotive crane. A 30-in. Chain-Belt apron feeder supplies either of the two materials to a Dixie No. 2424 non-clog hammer mill which has a traveling breaker plate. A 70-ft. centers belt conveyor feeds the crushed material into a 6- x 80-ft. rotary dryer which is fired by coal in the same way the clay dryer is fired;—coal is prepared by one of the direct-firing B & W unit mills. The coal is pumped from the mill by a 6-in. Fuller-Kinyon pump through a 4-in. line to the dryers where it is stored in bins and blown into the dryers.

Dried material is elevated to a 12-in. screw conveyor over a bin and is fed into a 5-ft. Riddell dry pan, and is then elevated and discharged into four cells. When these cells are full the dryer is stopped and blending begins. Pneumatically-operated gates discharge the contents from the four cells simultaneously into a larger cell below and re-circulation takes place three times, with a sample taken as the materials go to analysis bins. Sand is processed in the same way but by-passes the dry pan into its single analysis bin. Sand is not sampled. Diaspore is sampled in the same way as the clay, and the iron cinders are sampled but by-pass the hammer mill. There are three release bins for the diaspore, three for iron and one for silica sand, all arranged in a row to utilize the same handling equipment to scale bins.



Dry pan where iron ore and diaspore are processed separately after being dried. From the dry pan, materials are conveyed and elevated into four blending tanks

Thus, four of the five materials that go into the manufacture of cement are brought to a uniform composition separately, and each is analyzed and approved before batching and blending. Limestone will be processed in much the same way, when the plant is completed, although some blending of limestone is already being done and hourly samples taken to correct batch proportions on the scales when necessary. Limestone is being quarried selectively and some is being washed in order to hold these adjustments to a minimum.

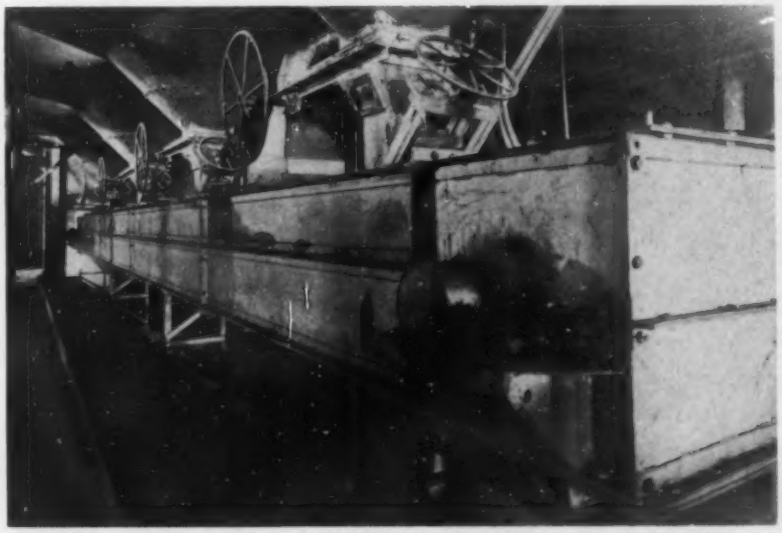
Proportioning Methods

Having determined the chemical composition of the daily batches, the chemist computes the mix and the scales are set. Five electrically interlocked Richardson scales are used, arranged in a row over a single drag conveyor which mixes and conveys the discharged materials to the raw mill. Each scale handles a separate material.

These are fully automatic hopper-type scales which differ only in size. The clay and stone scales have pan feeders while the others are fed by screw feeders which are inclined and have flush governors. These screw feeders consist of a high speed unit that handles 70 to 80 percent of the batch before shutting off and the second one brings the batch to exact weight at dribble speed. They are driven by motorized speed reducers.

Clay is carried from its analysis bin by screw conveyors and by a

(Continued on page 102)



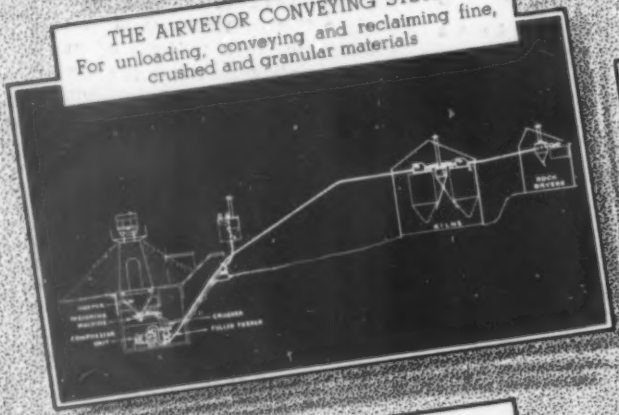
Double-deck drag conveyor under four clay blending tanks. The discharge is simultaneous for transportation back to receiving tank and recirculation

Fuller Equipment

FULLER-KINYON CONVEYING SYSTEM
STATIONARY TYPE
For conveying dry pulverized materials

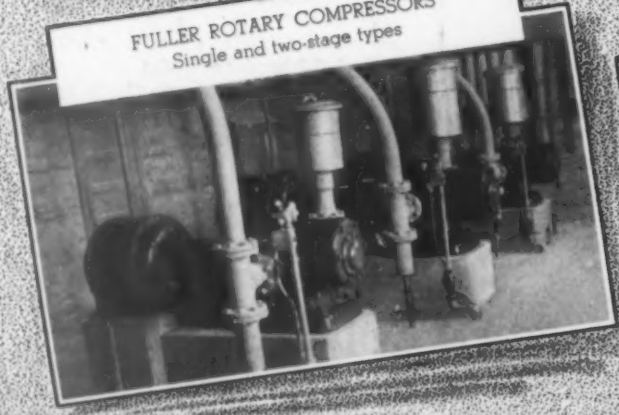
FULLER-KINYON REMOTE-CONTROL UNLOADER
For unloading dry pulverized materials from box cars, ships, barges, flat-bottom storage bins

THE AIRVEYOR CONVEYING SYSTEM
For unloading, conveying and reclaiming fine, crushed and granular materials

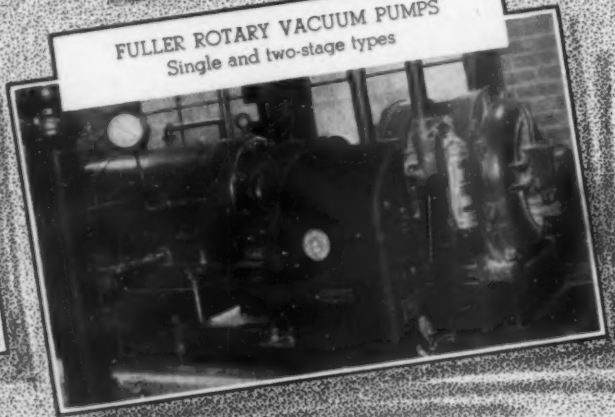


FULLER-KINYON CONVEYING SYSTEM
PORTABLE TYPE

FULLER ROTARY COMPRESSORS
Single and two-stage types



FULLER ROTARY VACUUM PUMPS
Single and two-stage types



FULLER COMPANY
CHICAGO—1144 Marquette Bldg.

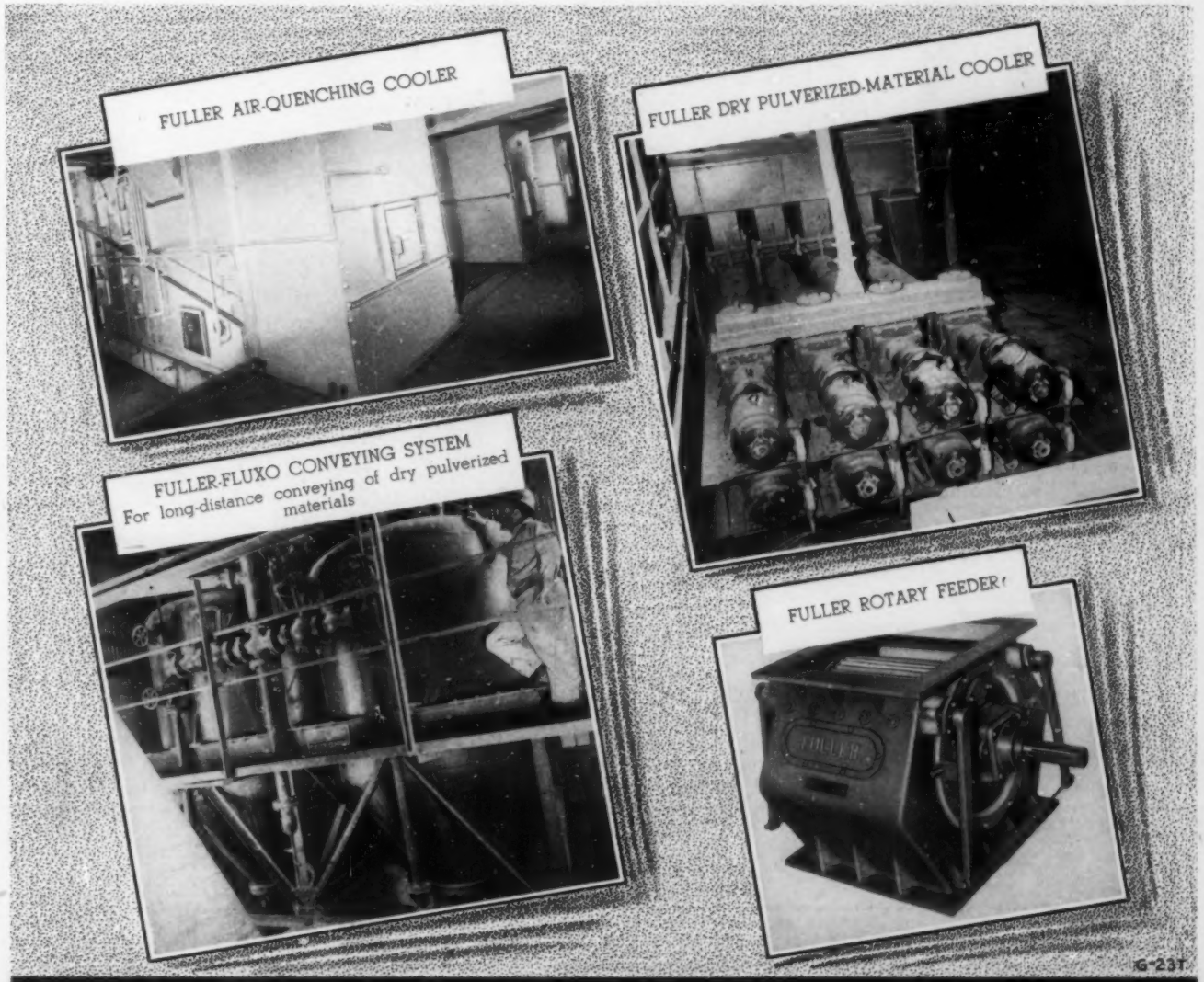
Defense Against High Costs

OUR AIM—The best equipment humanly possible to build . . . engineering, workmanship and materials, the finest money can buy . . . all with a view toward long, continuous operation at the lowest possible production cost.

This principle has had its reward, as is evidenced by the general use of Fuller equipment in the industry, much of which is accepted as conventional.

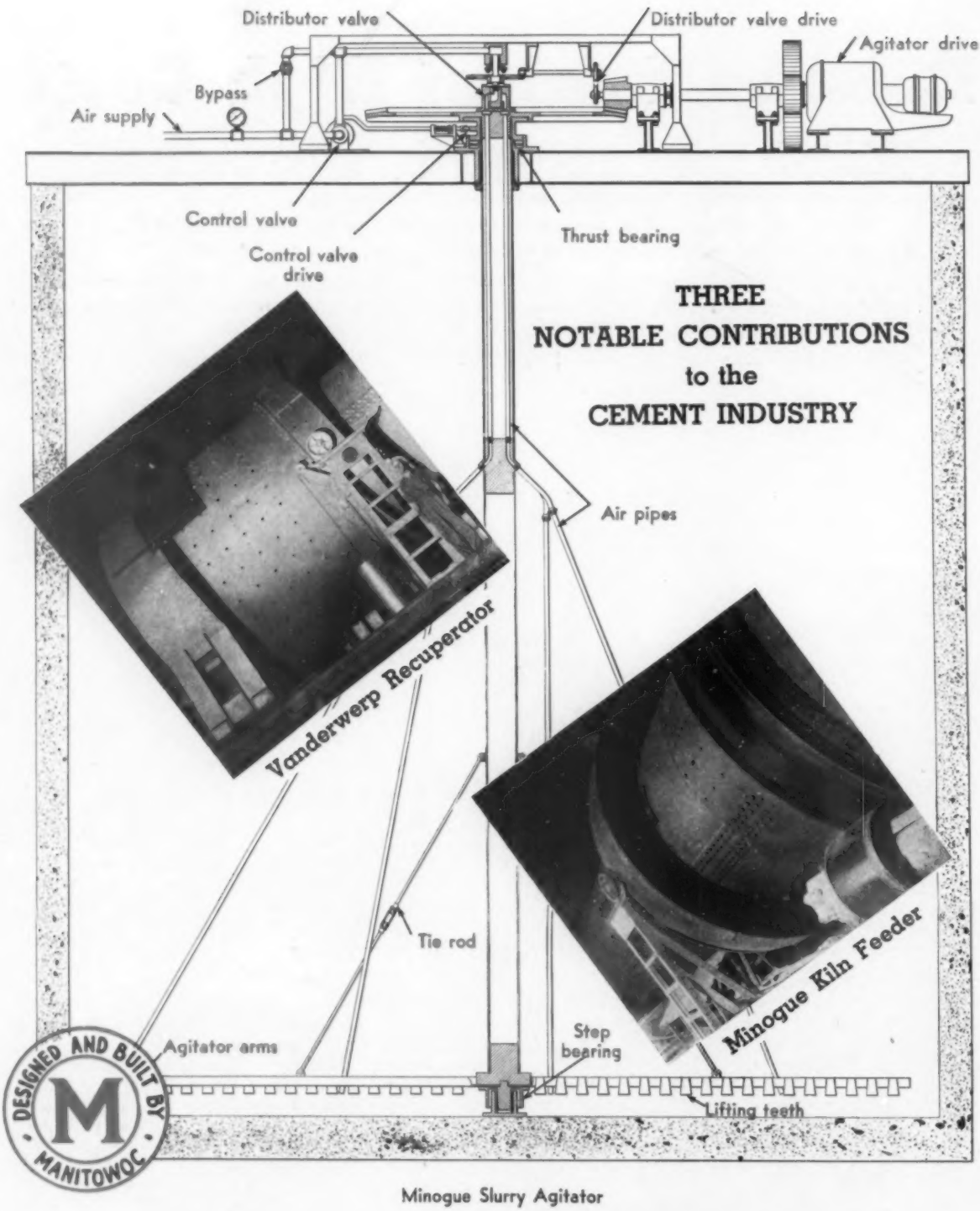
Fuller will continue to follow this principle . . . also, to pioneer in the development of equipment, through research and experimentation, for the betterment of the industry.

Your problems are our problems. Tell us about them . . . we may be able to help.



CATASAUQUA, PA.

SAN FRANCISCO—320 Chancery Bldg.



Minogue Slurry Agitator

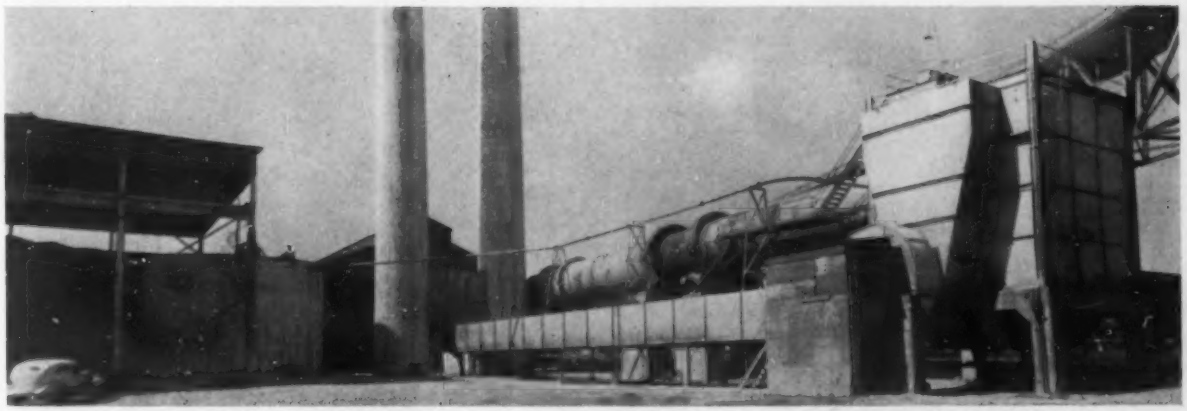
MANITOWOC ENGINEERING WORKS

Division of

Manitowoc Ship Building Company

GENERAL OFFICES AND PLANT
Manitowoc, Wisconsin

CHICAGO OFFICE
131 E. Wacker Drive

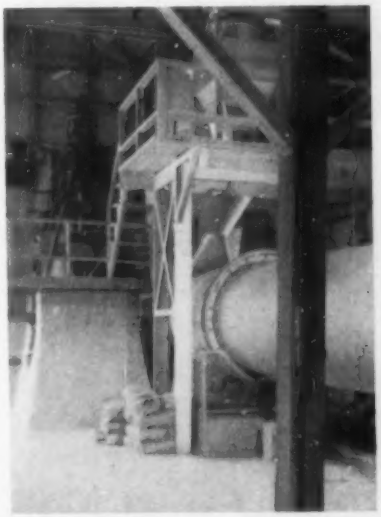


This 400 ft. kiln was made by joining two 200 ft. kilns together in 1941. Greater length plus heat recuperation have reduced coal consumption materially. The kiln has synchronized 100-hp. variable speed motor drives

Trends in Calcination

Using more automatic controls and recording devices to regulate kiln operation. Air quenching coolers and firing with unit mills coming into more general use

PROGRESS in 1941 in calcining portland cement clinker emphasized control devices and instrumentation for greater fuel efficiency in firing and for product regulation. Optical pyrometers, automatic temperature recording devices, positively regulating air tempering dampers and devices to automatically regulate kiln speed, or the rate of coal feed, to compensate for measured variations in the hot zones of rotary kilns are the types of apparatus referred to. A trend in that direction appears to be just gaining momentum. Certain other tendencies, such as heat recuperation, air quenching cooling of clinker and firing with unit mills are continuing to gain in number of installations.



Feed end of a 54-in. by 30-ft. steam-tube rotary dryer for drying mica in the plant of Kaolin, Inc., Spruce Pine, N. C. Centrifuge in background first reduces moisture content from 70 percent to 30 percent

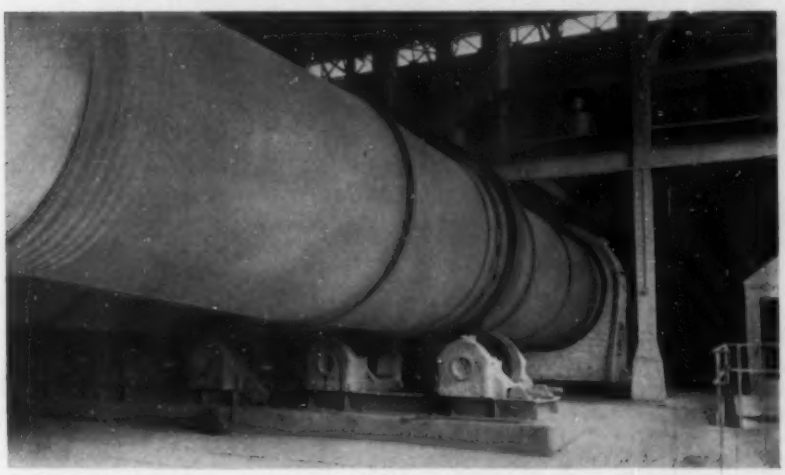
Longer Kilns

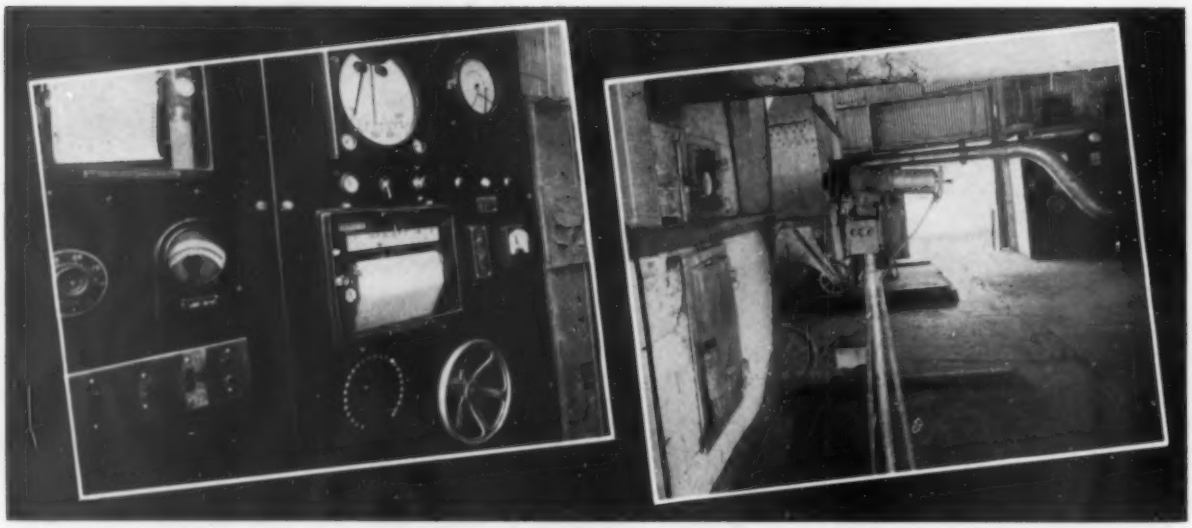
New wet process kilns installed during the year are continuing a trend toward greater length to increase thermal efficiency. Permanente Corp., Oakland, Calif., has placed an 11- x 464-ft. F. L. Smidth Unax kiln into operation during the year, increasing capacity to 16,000 bbl. a day from four kilns. The kiln ends were enlarged to 12 ft. It was also provided with heat exchanger chains. Numerous other kilns in wet process plants have bettered fuel efficiency by adding similar heat exchangers.

Marquette Cement Manufacturing Co., in rebuilding the Hawkeye Portland Cement Co. plant, recently taken over, will have an 11½- x 475-ft. Allis-Chalmers kiln equipped with chains for over 105 ft. of shell length.

Another midwestern plant, during the year, joined two 11 ft. 3 in. by 200-ft. kilns into a single 400-ft. kiln; equipped it with chains and a heat recuperator and cut fuel consumption about 40 lb. of coal per bbl. The two original 100-hp. variable speed motors and gear drives were retained

This kiln has had its capacity enlarged by replacing a 40-ft. length at the hot end by 40-ft. of enlarged zone shell, which is of welded construction. The connection with the main shell is of welded and rivetted construction





Left: Partial view of electric control board at Coplay Cement Manufacturing Co. plant, with instruments to automatically regulate kiln firing. Right: "Radiamatic" tube focussed through peep hole in kiln hood upon the kiln lining. Temperatures so observed are automatically and continuously recorded, adjustments in firing rate automatically taking place with variations in temperatures

in their original position with respect to the kilns and were synchronized into a dual drive.

In at least one instance capacity of existing kilns has been increased by adding an enlarged burning zone; in this case, to replace 40 ft. of the original kiln length.

Few new kilns were installed in dry process plants. Pennsylvania-Dixie Cement Corp. placed into operation four all-welded Vulcan kilns at its No. 4 Nazareth plant. Their lengths, 140 ft. for two, and 136 ft. are comparatively short considering that they have 10-ft. diameters, but each is connected to a waste heat boiler. In this plant higher kiln efficiencies, attributable to heat recuperation and control devices, have lowered the heat available for waste heat power generation. It may be that some electric power will have to be purchased, which will be more than justified by a reduction in coal from 105-lb. to 76-lb. per bbl. In a few dry process plants where the kilns have been made much more efficient, consideration is being given to burning some excess coal to meet the requirements of waste heat boilers.

More Insulation Being Used

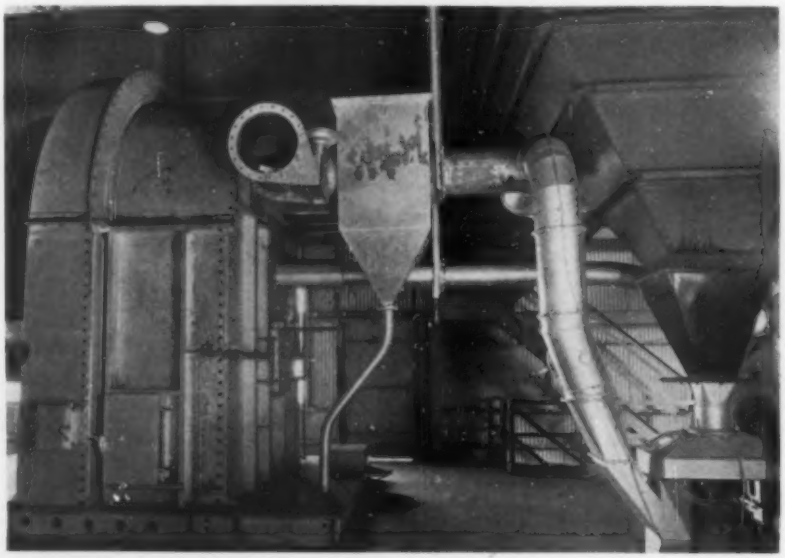
Most new kilns, and kiln extensions, are welded now that the process of manufacture has been perfected. Welded kilns weigh about 15 percent less than rivetted kilns of the same size. Rigidity of the shell is greater, and welding reduces the possibility of deflection of the kiln with correspondingly less wear on the refractories. Absence of rivet heads in the inside of the welded shell lowers the cost of installing refractories, and maintenance of the lining is reduced. Air seals, firing hoods, support mechanisms and other kiln accessories are also being made of welded construction.

Kiln insulation is receiving more attention from portland cement manufacturers, particularly in dry process kilns connected to waste heat boilers. Pennsylvania-Dixie Cement Corp,. for example, has insulated its four new welded kilns at Nazareth, Penn., for two-thirds of their lengths and lined them all the way.

These kilns are 136 ft. and 140 ft. and have 90 ft. of their total length from the back end lined with Johns-Manville Superex insulating block. Most of them are 3-in. thick. The kiln lining over the same length is 40 percent Harbison-Walker block, with 60 and 70 percent alumina block in the hotter parts of the kiln. Insulation will become more important as fuel-clinker ratios are lowered, where waste heat boilers were designed years ago to accommodate the kilns as they were then fired.

More Controls Required

Electric recording instruments and devices to automatically control kiln operations are becoming established in the portland cement industry. Fuel economy is one of the goals achieved by the use of these instruments, but just as important is the need for uniform burning conditions in the kilns which can be had by these



Automatic tempering damper to control the temperature of the pulverized coal and primary air from unit coal mill into one of the kilns of the Pennsylvania-Dixie Cement Corp. plant No. 4

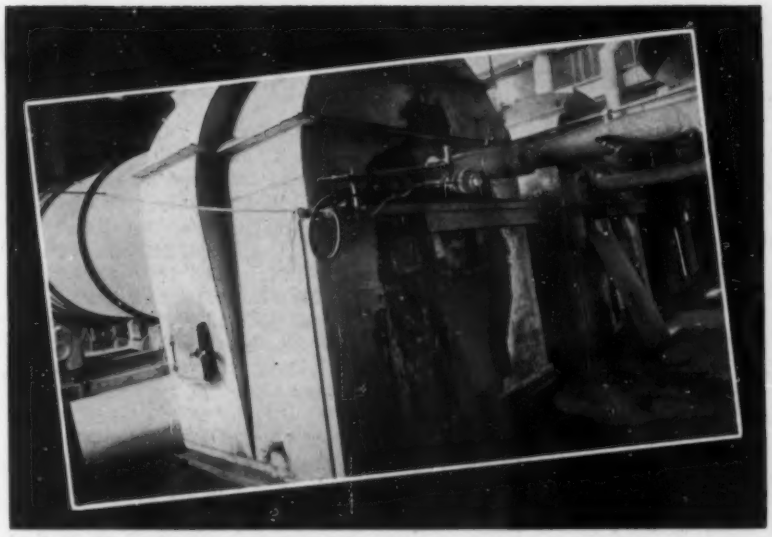
means. Product uniformity is one result of knowing and maintaining uniform kiln conditions.

During the year 1941, many rotary kilns were equipped with radiation pyrometers, which focus on the kiln lining through a peep-hole in the kiln hood. A continuous measurement of the hot zone temperatures, so observed, is recorded. In kilns equipped with these devices, adjustments in firing are made automatically or manually, to hold the temperature at a pre-determined figure.

Two principal methods of control have been observed during the year, both based upon temperature measurements. One is to hold the firing rate constant (using pulverized coal), while varying the kiln speed and the rate of the raw material feed into it correspondingly. The other is to automatically regulate the rate of fuel supply into the kiln while holding other possible variables constant. Choice of either method depends upon the physical equipment in the plant. Both have certain advantages.

Coplay Cement Manufacturing Co., Coplay, Penn., in firing kilns with Whiting "impact coal pulverizers," a newly-introduced unit mill, holds the kiln speed constant. Kiln temperatures are measured by a Brown Instrument Co. "Radiamatic" tube focussed through a hole in the firing hood and are recorded on a Brown recording potentiometer at the instrument panel-board.

Rate of coal feed into the direct-firing mills is automatically varied to hold the kiln temperatures constant within a variation of only 25 deg. F. Each of the coal mills is fed coal by an integral screw feeder driven from a Link-Belt P.I.V. gear reducer. Rate of speed of the feeder is increased or decreased at regular intervals through the action of an electrical relay in the potentiometer circuit. At 30-second intervals the potentiometer makes a contact which changes the gear reducer speed if the temperature of the hot zone has varied up or down from the desired figure. Compensation for kiln temperature variations is almost instantaneous in this hookup.



This kiln, in a southeastern cement mill, has a Leeds and Northrup Rayotube pyrometer, and the rate of coal feed into a unit coal mill firing it is automatically varied with changes in kiln temperatures

In certain other plants, a recording temperature chart serves as a check on the burner, who reads it at regular intervals and manually makes adjustments when necessary.

Pennsylvania-Dixie Cement Corp., on its four new Vulcan kilns at Nazareth, Penn., uses the same kind of temperature measuring and recording equipment as the Coplay plant but adjusts the kiln speed to compensate for temperature variations as indicated on the potentiometer. These kilns have unit ball mills for direct-firing. A constant rate of feed of pulverized coal and automatic regulation of the air going into the kilns are maintained. The kiln speed is adjusted, when needed, at the panel-board by re-setting the kiln drive rheostat. The kiln feed drive rheostat automatically changes with it, synchronizing the rate of feed into the kiln with the kiln speed.

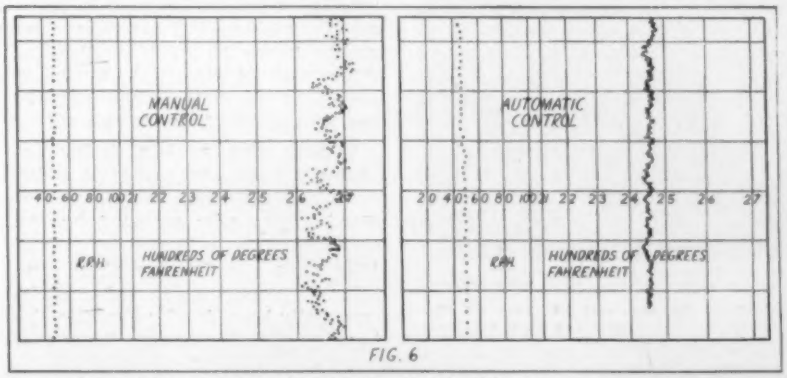


FIG. 6

Comparison of the accuracy of manual control in firing a kiln, with automatic control with the use of a radiation pyrometer

Showing properly located poke holes for hot zone of a shaft lime kiln, accessible for trimming

Clinker Coolers

One of three grate type clinker coolers (Fuller) installed at the Bath, Penn., plant of Penn-Dixie Cement Corp., to save fuel and improve grindability

Hot air for the grinding operation is taken from the kiln hood, in this plant, and tempered before entering the ball mill. To take care of variations in moisture content of the coal, the temperature of the air entering the mill is varied by changing the quantity of cold air admitted by the tempering damper. The damper is automatically actuated by a Brown Air-O-Motor to constantly maintain the temperature of the coal-laden air leaving the mill at 150 deg. F. Other makes of electrical kiln control equipment are being used to do the same job. At still another plant, a Leeds and Northrup pyrometer and Micromax automatically speed up or slow down the coal screw feeder into a Whiting unit mill as the kiln temperature goes down or increases. The drive on the feeder into the mill is V-belted to a tachometer which records the feeder revolutions on the instrument board. Air flow, both volume and temperature, is also automatically regulated.

Instruments are being installed in plants to indicate or record, dust chamber temperatures, gas temperatures, air temperatures entering the coal mills, clinker cooler temperatures, the draft inside the kiln hood and practically all the variables entering into the firing of rotary kilns.

Direct Firing Continues Gains

Direct firing with unit coal mills continues to gain for firing rotary kilns. To date about 200 kilns of a total of 900 in the portland cement industry have been equipped with these mills.

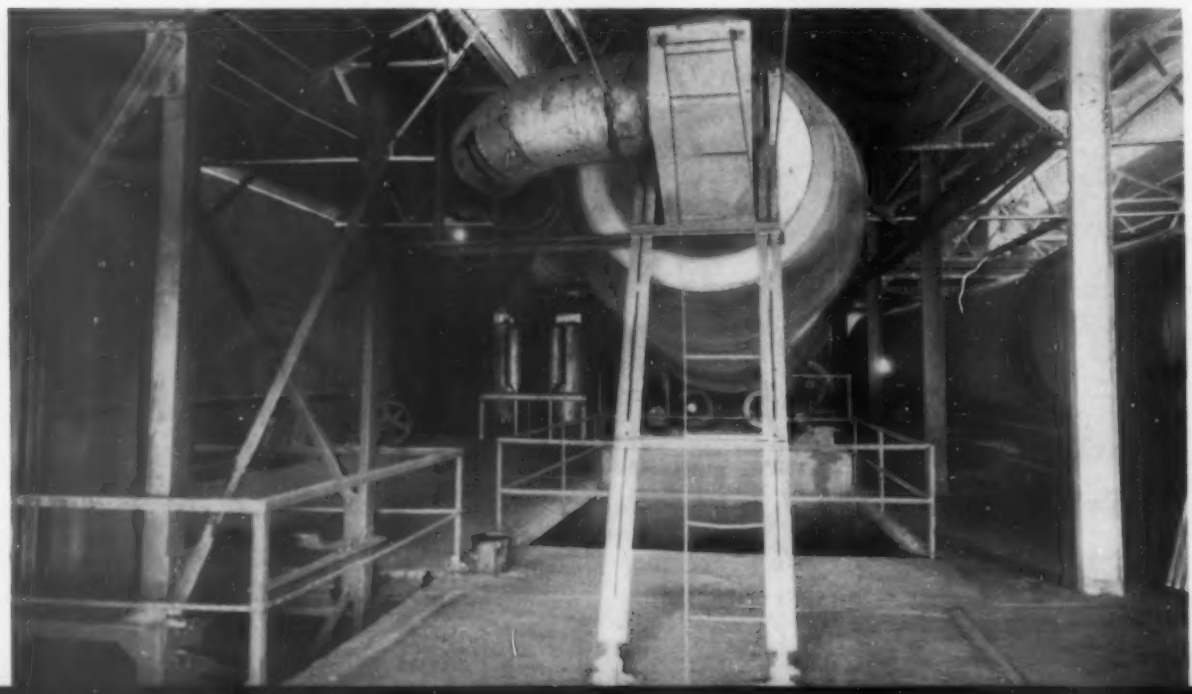
Drying

Eimco slurry filters, believed to be new to the portland cement industry, are being installed in two wet process plants. Three 12 ft. 6 in. diameter filters with 11 discs will soon be in service at the Silica, Ohio, plant of the Medusa Portland Cement Co.

Typical of a modern drying arrangement for wet materials which must be screened dry is the layout of Kaolin, Inc., now operated by the Harris Clay Co., at Spruce Pine, N. C. Mica from the flotation plant contains 70 percent water and must be essentially bone dry for accurate sizing over vibrating screens. Forty per-

Above: Vanderwerp Recuperator installation on kiln equipped with pyrometer

Below: Feed end of rotary secondary cooler which handles output from all the kilns in this plant. One of the kilns is shown to the right and the Parsons dust collector for catching clinker dust is to the left



Direct Firing Units

cent of the water is first removed through a Fletcher centrifuge and the rest through a 54-in. by 30-ft. Louisville steam-tube rotary dryer. A draft is induced through the dryer to exhaust into an American Air Filter Co. wet-type "Rotoclone" dust collector. No dust is allowed to escape.

Air-Quenching Coolers

Air quenching clinker coolers are being installed in increasing numbers, to condition the clinker and increase the capacity of grinding mills. All of them are of the sudden quenching type. Individual coolers, such as the Fuller inclined grate clinker cooler, are representative of many of those in use, while others, such as the Vanderwerp heat recuperator are integral with the kiln.

Some of the installations perform the desired function of suddenly dropping the clinker temperature about 1000 deg. F., to freeze it into certain compositions, and then cool it down to practically atmospheric temperature as an aid to grinding. In others, a rotary secondary cooler supplements a quenching cooler to prepare the clinker for early grinding. In all the plants with new coolers, heated secondary air for combustion in the kiln is made available from the clinker cooler.

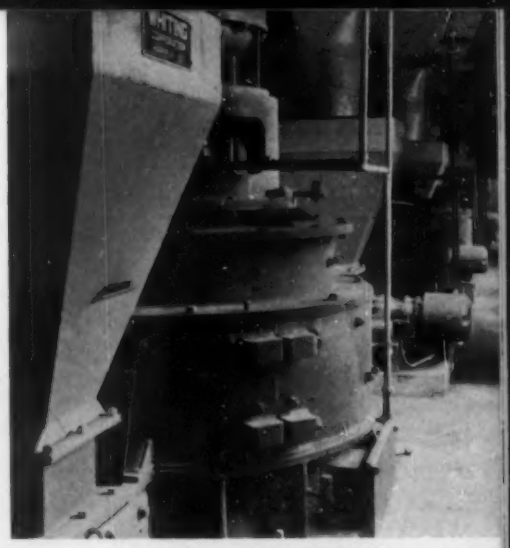
Heat Treatment to Reduce Alkali Content

Yosemite Portland Cement Co., Merced, Calif., has an unusual installation, made to hold the alkali content down to 0.6 percent, in manufacturing cement for the Central Valley project. It consists of reheating the clinker after it comes from the kilns. Clinker is dropped from the kilns into 7- x 100-ft. rotary "kilns" which were formerly used for coolers. They are fired by oil burners and the clinker is treated for 12 minutes in the reheating zone where reducing conditions are maintained at about kiln temperatures. About 400,000 B.t.u. per bbl. are required if the alkali in the clinker is high.

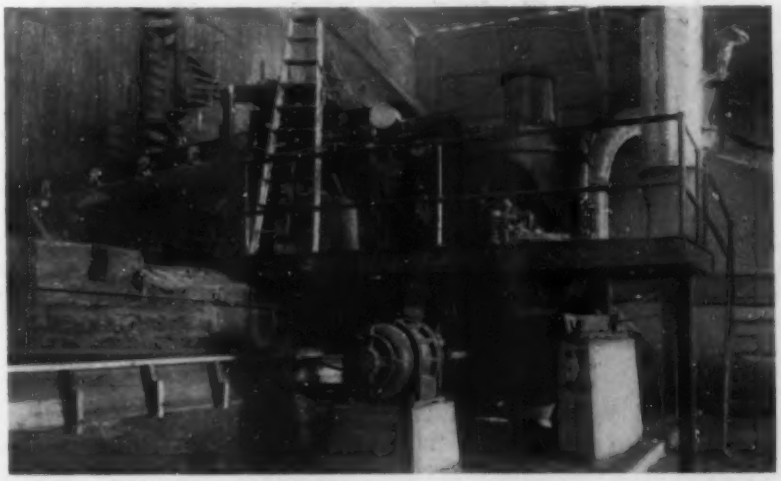
Calcining Lime

An outstanding development in burning lime is the kiln developed at the Utah Lime and Stone Co., Salt Lake City, Utah, which is designed to

(Continued on page 103)

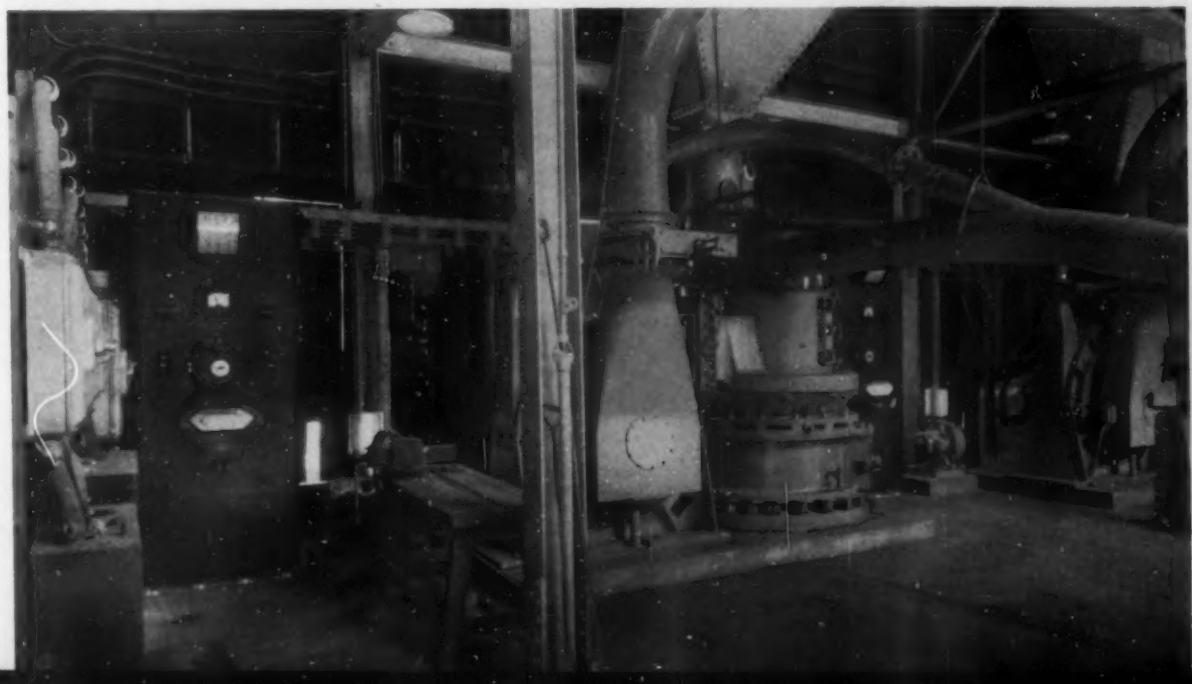


Row of six Whiting mills with coal bins above for direct-firing cement kilns. Below may be seen Westinghouse motors and Link-Belt P.I.V. drives on coal feeders



Above: Unusual method of feeding the Raymond direct-firing bowl mill is to be found in this cement plant. Note the short belt conveyor to the top of the mill from the concrete coal bins

Below: Close-up of B. & W. unit coal mill and instrument panels. In the illustration may be seen small air compressors which keep dust out of mill bearings



Diesel-powered locomotive of B. V. Hedrick Gravel and Sand Co. hauling pit run sand and gravel to washing plant

Speed Up Haulage

Increased use of Diesel-electric locomotives and large truck and trailer body combinations to increase delivered tonnage

DURING 1941, rock products companies improved haulage facilities and increased the delivery rate of excavated materials to processing plants.

In motor truck haulage, bigger units have been coming into use each year, while in industrial haulage systems, Diesel or Diesel-electric locomotives are displacing many steam locomotives.

Marquette Cement Manufacturing Co., Chicago, Ill., for example, has put a 65-ton General Electric Diesel-electric locomotive in operation at the Earlham quarry of its Des Moines, Iowa, plant. A steam locomotive for moving the trains of quarry cars as they are being loaded has been replaced by a Caterpillar tractor with a Hyster winch, making a very handy car-spotting and loading arrangement. The tractor is spotted just opposite the power shovel and has an elevated cab so the operator can see down into the empty cars. By means of the winch the operator moves the train along under the shovel bucket a few feet at a time to load them uniformly.

Diesel Locomotives

Illustrated herewith is a new 25-ton Plymouth locomotive, with 200-hp. Caterpillar Diesel engine drive, in service at B. V. Hedrick Gravel and Sand Co. plant at Lisleville, N. C. This locomotive hauls several 12-cu. yd. cars of sand and gravel from the company's excavation to the processing plant.

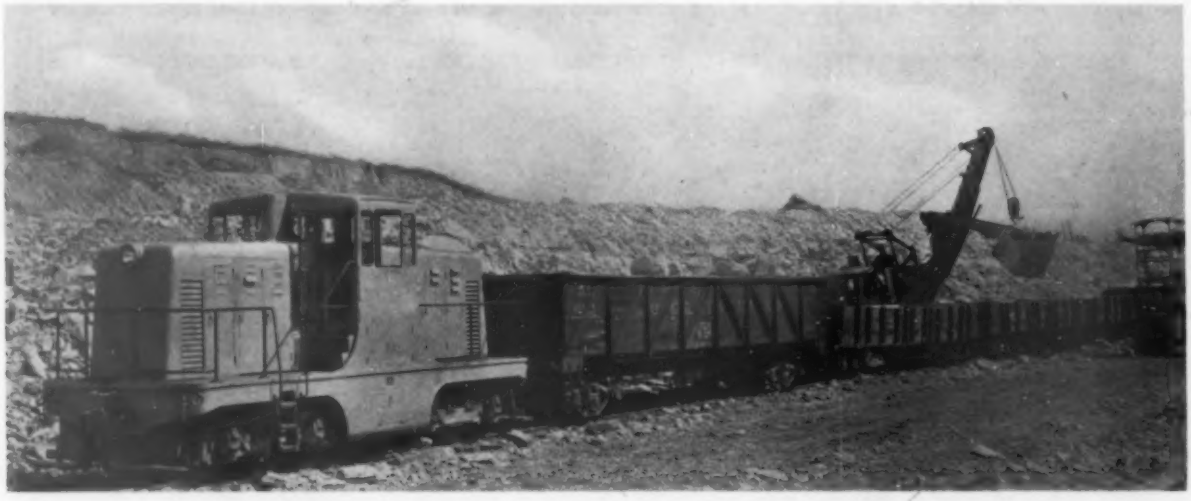
Large earth-mover equipment, such as the LeTourneau and LaPlante-Choate types, is being more extensively used, particularly in stripping operations, where they function as hauling units in the disposal of these materials.

Motor Trucks

The tendency in motor truck equipment is more and more away from the old style dump truck bodies. Capacities are getting bigger too. Elsewhere in this issue attention is called to haulage units consisting of semi-trailers plus trailers at the Southwestern Portland Cement Co. quarry at Victorville, Calif., that will handle 60 tons to a load.

Among the lighter motor trucking equipment, semi-trailers are coming into wider use under heavy service conditions. With Ford and Chevrolet chassis, they regularly handle 14 or 16 tons of rock to a load.

During the year, at least two quarries have converted to truck haulage where the incline to be negotiated out of the quarry requires the use of a barney car and power-driven cable to pull the loaded trucks out of the



Sixty-five ton Diesel-electric locomotive in operation at the Earlham quarry of the Marquette Cement Manufacturing Co., Des Moines, Iowa, plant

Loading limestone in the quarry of the Volunteer Portland Cement Co., Knoxville, Tenn. The Easton semi-trailer, shown here, has a Ford chassis and hauls 14 to 16 tons of limestone to a trip

Semi-trailer truck in a cement plant quarry at the head of crusher incline. Note "barney" car which pulls loaded trucks up the grade

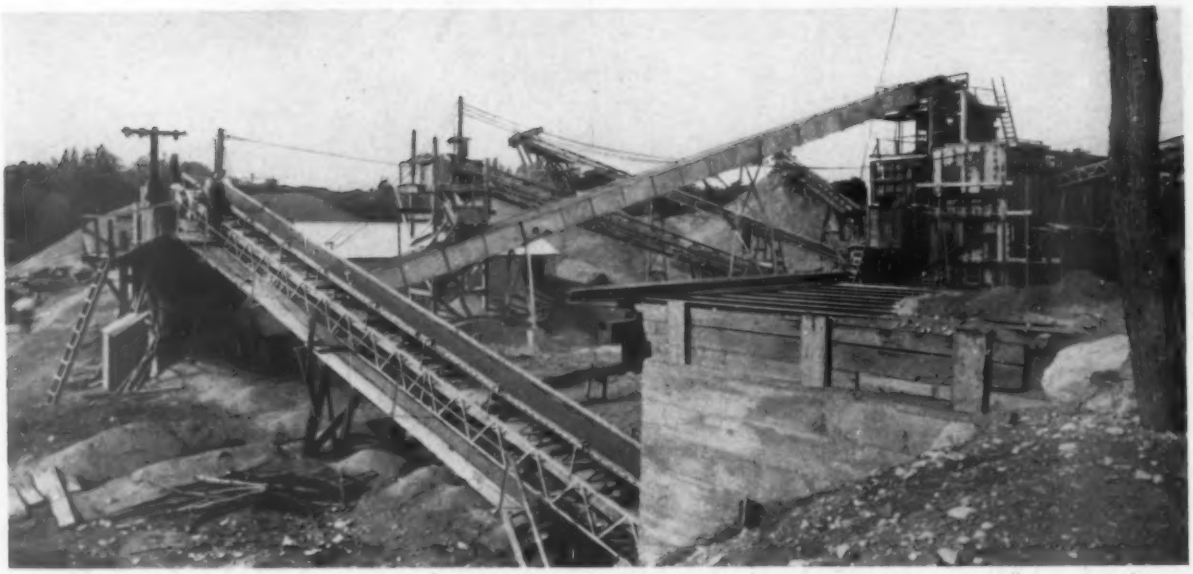
quarry. The idea was developed several years ago at one of the quarries of the New York Trap Rock Corp., and is the pattern for the others. The mobility and flexibility of motor trucks down in the quarry are considered of such importance by these operators as to justify their purchase even if they are unable to come out of the quarry on their own power.

At the Cedar Bluff Quarry, Princeton, Ky., five new 95-hp. Ford trucks, with dual rear wheels and Hercules end-dump bodies have gone into service. These trucks hold six tons and must be pulled up a 22 percent grade for 600 ft. to dump into the primary crusher. A cable-drawn barney car pulls them up the incline while their engines are idling.

In the quarry of a large cement company, a similar barney car is used for a 10 percent grade, 200-ft. long, pulling Easton semi-trailers. The units are powered by Chevrolets and haul 8 tons.

Other large capacity carriers for hauling excavated materials are being adopted and many miscellaneous uses for trucks are being found.

Loading asbestos in a mine operated by Vermont Asbestos Mines, division of The Rubberoid Co., near Eden, Vt. Hauling to the plant, 1000 ft. one way, is done in two Euclid wagons operated by International TD-18 Diesel tractors. Each wagon hauls 14 to 15 tons



No bin storage or reclaiming belt conveyors are used in this new plant. Sand and gravel are stockpiled as produced, with a crane and portable loaders to load trucks

Large Deliveries from Stock

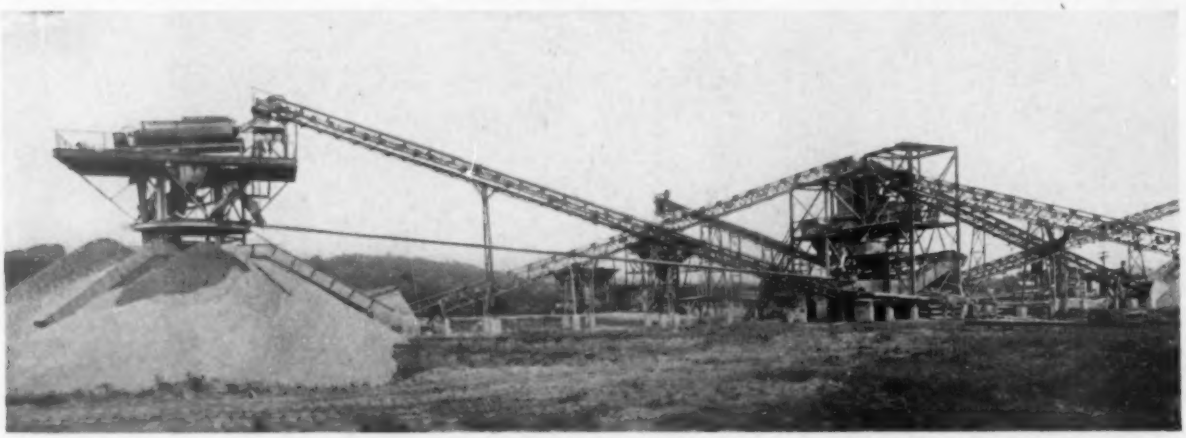
To compensate for limited production capacity plants having defense contracts have turned to increased stockpiling facilities

NEW ARRANGEMENTS of standard equipment for stockpiling and handling rock products are the main developments in this part of plant operation. Storage capacities and facilities for loading out materials economically have had to be increased much more than plant producing capacity would normally justify. This is particularly true of plants producing materials for large defense projects. For example, a 40,000- or 50,000-ton stockpile might be carried by a plant that produces as little as 100 tons of aggregates per hour.

Belt conveyors, cable drags and scrapers, trucks, bulldozers and clamshell bucket transfers are the principal types of equipment for stocking large piles of material and recovering it for loading.

Large open stockpiles with reclaiming tunnel conveyors are more common. Auxiliary equipment such as bulldozers, scraper buggies and slackline buckets are coming into more use in extending stockpiles and reclaiming from dead storage to the point where conveyors handle it the rest of the way in returning the materials for recrushing or for loading. Bulldozers used for this purpose operate intermittently, but the jobs they can do in other parts of the plant, for stripping, cleanup work in the excavation and general utility service usually keep them busy.

To hold down large capital investment tied up in stockpiles of finished



New sand and gravel plant of the Southern Ohio Quarries Co. at Chillicothe, Ohio, represents a typical plant layout for open storage. Reclaimed material is weighed out into trucks on platform scales from a bin filled by a belt conveyor

Above: An example of efficient barge loading and portable stockpiling equipment is illustrated by the Sunset Rock and Sand Co., layout near Miami, Fla. From left to right may be seen a Barber-Greene portable conveyor handling stone from the crushing and screening plant, a Pioneer conveyor, and a Northwest portable crane with an Owen clamshell

Below: Open stockpiling system of Raleigh Granite Co. sand and gravel plant at Garysburg, N. C. Stockpiles of this kind, which lend themselves to large storage reserves with economical handling and easy blending, are becoming more common

Loading out bins of 600 tons capacity at Arundel Corp. plant. Sand and gravel are weighed out into trucks by weigh batchers

Above: Partly-processed crushed stone in storage over a belt conveyor at the Raleigh Granite Co. plant at Greystone, N. C. This stockpile is a reserve against breakdowns and is a means of keeping a steady flow of stone to the plant

Below: Flexible arrangement of chutes in the new Ohio Marble Co. limestone plant at Piqua, Ohio. Swivelling spouts can be directed to any one of several bin chutes

materials it might be well to consider the storage of unprocessed materials where they can readily be put through the plant. By using LeTourneau or La Plant Choate scraper buggies, slackline buckets of the Sauerman type, or other equipment, unprocessed materials could be intimately mixed to get a more homogeneous mixture of sizes and qualities to feed to the processing plant. Another possibility would be the accomplishment of a rough segregation to provide selected materials.

In rebuilding its crushed stone plant at Greystone, N. C., the Raleigh Granite Co., Raleigh, N. C., provided a reserve storage capacity for 100,000 tons of partly-processed stone. This concern is shipping large tonnages of crushed stone to defense projects, and a large reserve of unfinished stone guarded against quarry breakdowns.

The primary crusher is down in the quarry and a 42-in. belt conveyor on 555-ft. centers carries the crusher product out of the quarry, where it is re-crushed and sized. From this point the stone can either be sent over belt conveyors to a washing plant or be stockpiled. Part of the primary belt conveyor out of the quarry is encased in a concrete tunnel, and a stocking belt conveyor places the stone, usually 3½-in. size, over the tunnel. It is a simple operation to reclaim the stone.

Another important function of this reserve storage system is its use in keeping the plant uniformly loaded. Should gaps occur on the belt carrying stone from the primary crusher, tunnel gates under the storage pile are opened to keep the belt loaded.

A stockpiling system developed by the Kelley Island Lime and Transport Co., for the storage and handling of flux stone at its Marblehead, Ohio, plant, is illustrated herewith as an example of a design which permits maximum rapid recovery of stockpiled material. It also is designed to prevent stone breakage.

The system is largely of Stephens-Adamson equipment. Belt conveyors bring the stone to a pivoted boom conveyor that measures 100 ft. from the pivot to the head shaft. Through its hinge, the boom may be raised or lowered 20 deg. above or below the horizontal so that the maximum fall of the stone is 4 ft. It also can swing horizontally through a 90 deg. angle. Electrically-operated hoists, with pulleys and cables, operate the movements of the boom, which will handle 600 tons of stone per hour. Live storage capacity is 35,000 tons, with bulldozers to handle stone into dead storage. Stone is reclaimed on a tunnel belt conveyor to load railroad cars.

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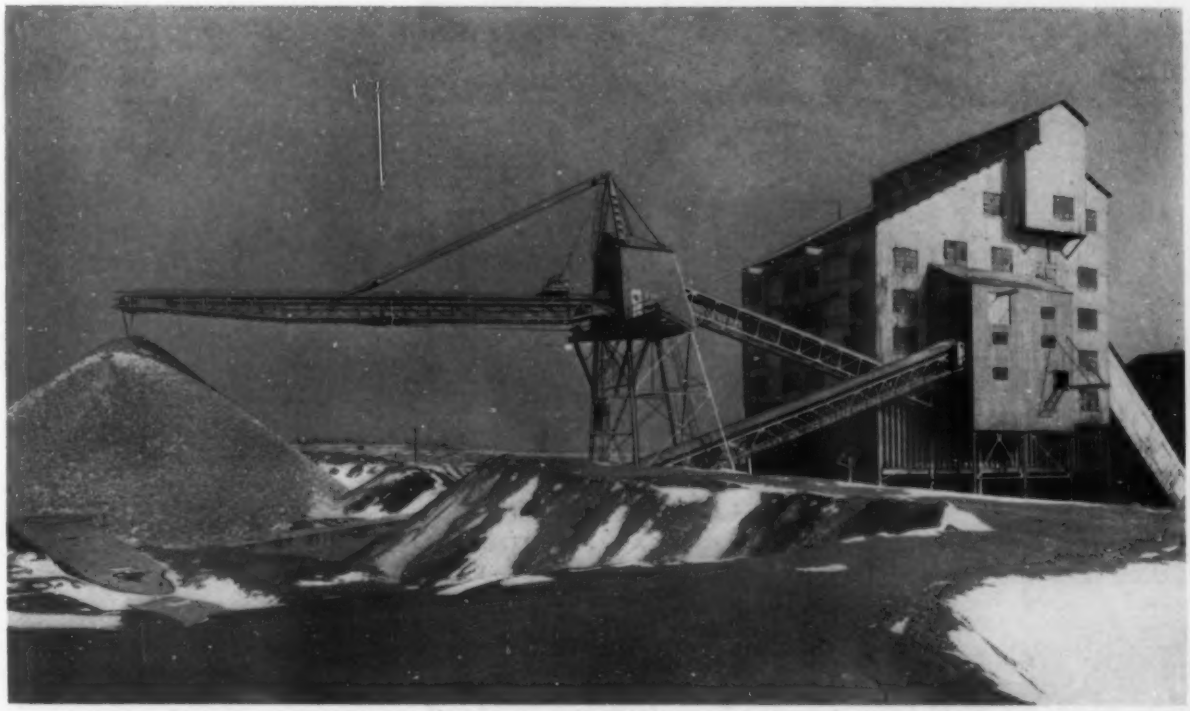
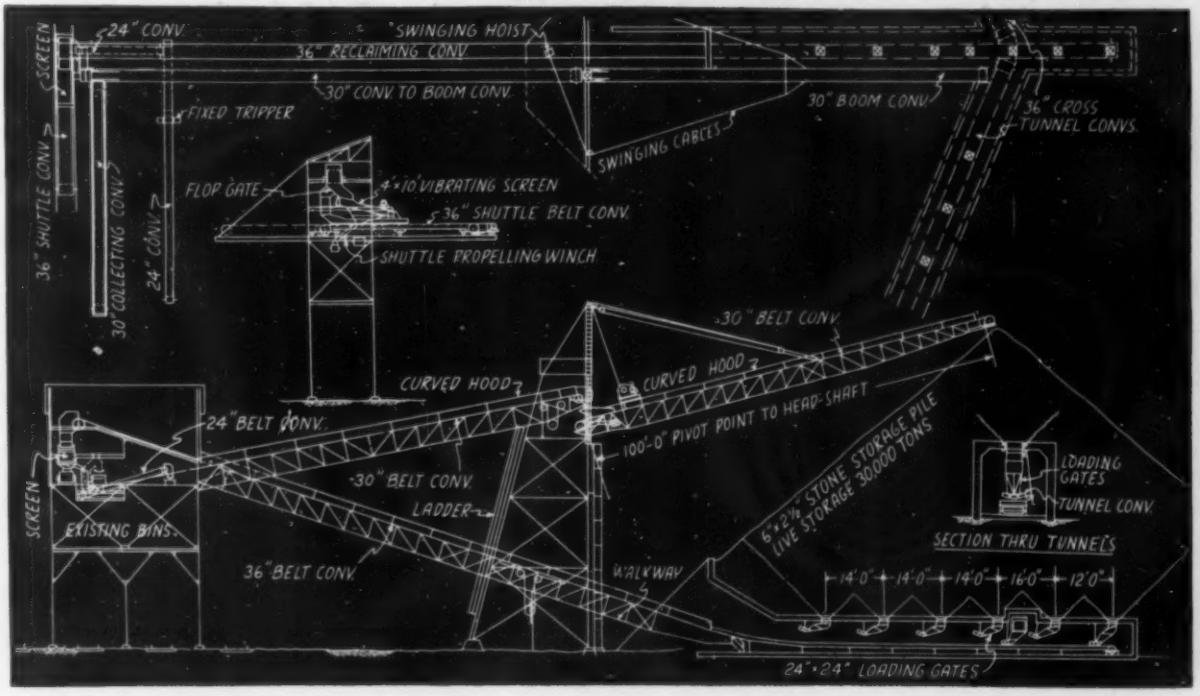
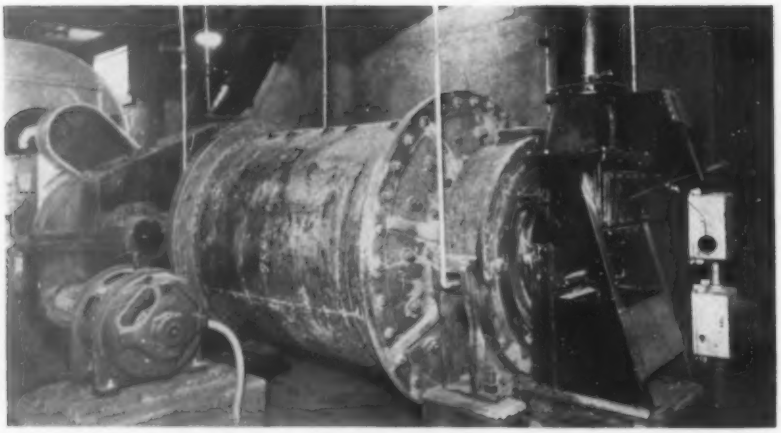
Kelley Island's Unusual Stockpiling System



Above: Stockpiling boom that swings in a vertical plane, as well as horizontally in stockpiling flux stone at Kelley Island Lime and Transport Co. plant

Below: Plan and elevation details of Kelley Island flux stone storage system and conveyor arrangement within the plant for handling into shipping bins





Left: Ball mills are used by the Pennsylvania-Dixie Cement Corp. for direct-firing kilns on the floor above. At the feed end, right, is a mill level control, and the pipe to the left carries pulverized coal up to the blower for the burner pipe

Reducing Grinding Costs

Grind clay and limestone in separate circuits, apply new developments in unit coal pulverizers, and grind agricultural stone finer

RECENTLY installed arrangements for pulverizing raw materials are of special interest, as they involve adaptations of certain types of grinding mills to more or less new uses.

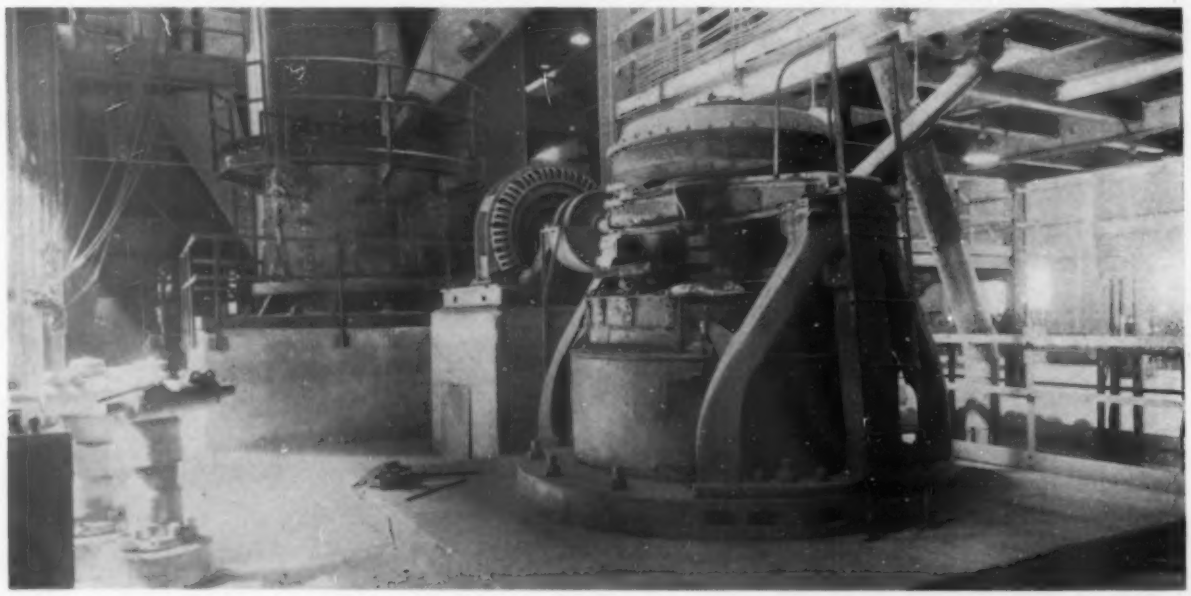
In grinding cement raw materials, the milling operations at the Permanente Corp. wet process cement plant near San Jose, Calif., are outstanding. This is probably the first plant to grind limestone and clay separately to desired finenesses and to blend them for kiln feed material.

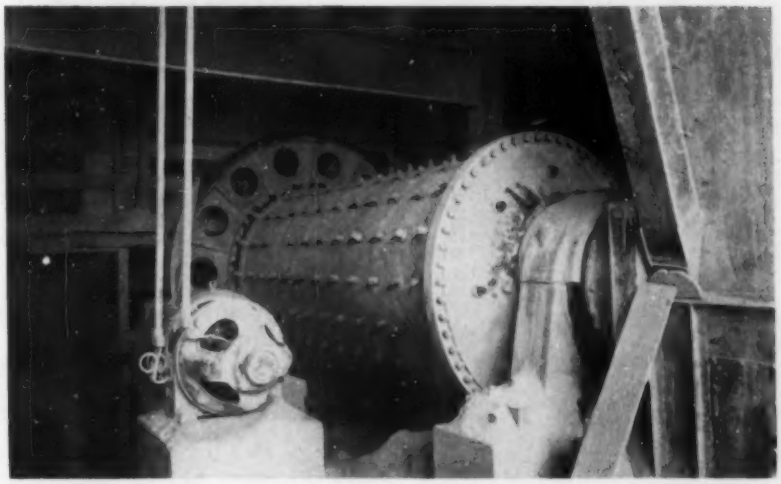
As grinding requirements of clay and limestone are not comparable, these materials could be ground at lower cost if done separately. From the chemists' viewpoint, control is much easier to accomplish.

Separate grinding of the limestone and clay was decided upon as necessary to a re-arrangement of the raw mill grinding circuit which also would reduce overall grinding costs. After an experimental run of 10,000 bbl. of specification low heat cement, grinding the limestone and the clay separately, the two ingredients were passed through a 7- x 26-ft. tube mill to insure uniformity of mix. Then it was found that the blended slurry could be pumped direct to the kiln feed storage tanks, intimately mixed and without segregation in the kilns.

Clay is ground through two tube

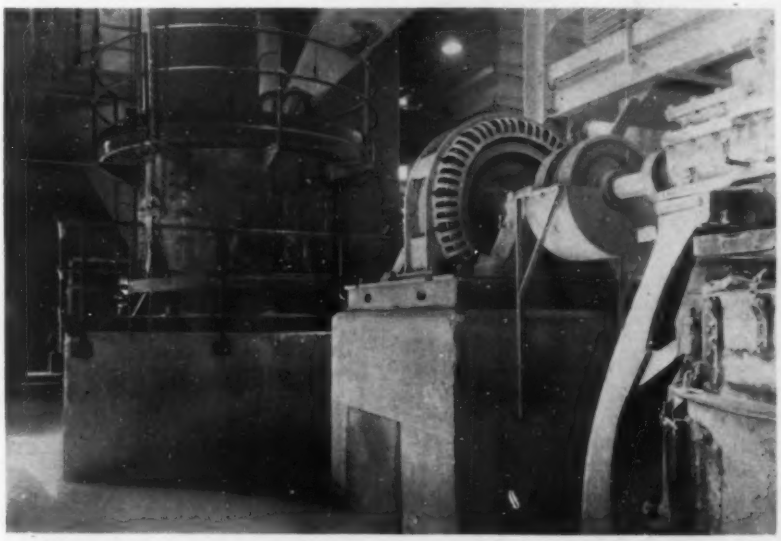
To the left: Raw grinding unit pulverizer mill in the rebuilt Union Bridge plant of Lehigh Portland Cement Co., in closed-circuit with a 16-ft. air separator. To the right: Preliminary mill on clinker grinding





Right: Rod mills are used by the Liberty Limestone Corp. to produce agstone and stone sand. An air separator is in circuit on sand to remove fines

mills in series (Traylor and Smidth), the first being in closed circuit with screens and the second in open circuit. Limestone is ground in two stages, with ball mills (Allis-Chalmers, Smidth and Traylor) closed-circuited with Dorr classifiers.



On the left may be seen the unit pulverizer in which all raw material is ground at the Union Bridge, Md., plant of Lehigh Portland Cement Co. The mill is in closed-circuit with a 16-ft. air separator and the system dries while grinding. Heat from a hot air furnace is piped into the feed elevator, piping and air separator which are insulated

Closing the limestone grinding circuits has increased the tonnage and the fineness. Control of particle size, which is becoming more recognized as a definite requirement in grinding for kiln feed purposes, is accomplished easier and cheaper in classifiers.

Burning conditions in the kilns have also been improved with closed circuit grinding, and there is seldom difficulty with rings. Free lime is less than one percent and the clinker is more uniform; with open circuit grinding, it varied and the free lime exceeded one percent. Clinker grinding capacity has gone up and it is possible to grind high-silica limestone without much effect on output, thus reducing the clay and the alkali in the kiln feed material.

Use Crushers Preceding Mills in Grinding Clinker

Control of the size of feed into grinding mills is essential to economical grinding and is becoming more recognized. A number of plants are now utilizing crushers ahead of grinding mills, for clinker grinding, since it has been proven uneconomical for a mill to do a crusher's job.

At the Volunteer Portland Cement Co. plant at Knoxville, Tenn., crushers installed for that purpose will serve as an example of their economy. Until recently, clinker as large as 1½- or 2-in. size was fed into a 7- x 39-ft., 3-compartment mill without any preliminary reduction. Two 1 ft. 4 in. Traylor TY high-speed gyratory crushers now reduce the clinker to 100 percent minus ⅜ in. and 70 percent minus ¼ in. for feed into the compartment mill which has had a fourth compartment added.

An increase of 60-hp. for power to drive the crushers is more than offset by savings in power to drive the compartment mill, which now has smaller grinding media. Power consumption has been decreased and production is the same as before but with more surface area.

In some other plants, grinding raw materials in the wet process, close circuiting preliminary mills with vibrating screens to remove the "spitzers," has materially increased tube mill production.

Dispersing Agents

Dispersing agents, such as RDA, when used for grinding raw material, are said to materially increase production in any kind of a grinding circuit with air separators, as well as in open circuit grinding. In closed circuit grinding with air separators, their use is claimed to result in better particle size distribution and separator efficiency. Dispersants of this kind could probably be adapted to the grinding of lime, limestone and other materials, with favorable results.

A good example of modern, simplified grinding practice for raw materials is the Union Bridge, Md., plant of the Lehigh Portland Cement Co. All the raw material is proportioned by electro-magnetic constant weight feeders and ground by a single unit pulverizer in closed-circuit with a mechanical air separator through an enclosed bucket elevator. Circulating loads as high as 1000 percent are car-

"Micronizing" machine uses steam under high pressure to pulverize mica to 3000-mesh equivalent or less

ried and the material is dried while being ground in the mill.

Ball Mills to Grind Agstone

Ball mills are coming into more extensive use for grinding agricultural limestone, particularly the higher grade products as measured by fineness. New Enterprise Lime and Stone Co., Ashcom, Penn., for example, is grinding limestone screenings into agricultural stone in a new plant, designed and equipped by the Hardinge Co., which has some interesting features. Grinding is done in a 36-in. by 6-ft. ball mill closed-circuited with a No. 45 Loop air classifier in a circuit under suction. Dried screenings are fed into the mill from a storage bin by a table feeder and the rate of feed is varied automatically by a Hardinge electric ear to keep the mill loaded at the best level for grinding. Rejects from the classifier return into the mill and the fines are packed in bags. The product is guaranteed to all pass 20-mesh and that 80 percent pass a 100-mesh screen. When the installation is completed, heat will be applied within the mill to dry the material as it is being ground. Two similar mills, 10-ft. x 66-in., equipped with loop classifiers are being installed in a cement plant to dry and grind cement raw materials.

Above: Loop classifier in closed circuit with Hardinge ball mill for the manufacture of agricultural stone by New Enterprise Stone & Lime Co., Ashcom, Penn.

Automatic overload electric controls regulate the fresh feed as the circulating load varies and variable speed drives on the feeders are the means of proportion control. The unit averages 40 to 50 tons per hour with a fineness of 92 to 95 percent passing a 200-mesh sieve. The elevating equipment is insulated by a concrete encasement and the air separator and ducts by asbestos covering, with a heated air stream from an automatic oil-fired hot air furnace circulated through the air separator, elevator and the mill. Raw material discharge temperatures are held between 150 deg. F. and 175 deg. F.

Unit Coal Pulverizers

During 1941, several noteworthy installations of unit coal pulverizers have been made for firing rotary cement kilns. One was the installation of four ball mills at the Pennsylvania-Dixie Cement Corp. plant at Nazareth, Penn. They are 5- x 6-ft. Kennedy air-swept ball mills equipped with automatic mill level controls. Maintenance was an important consideration in selecting unit ball mills, each of which has an integral drive gear connected to a 50-hp. motor through a flexible coupling. Variable speed table feeders feed coal into the mills, and tempered air taken from the kiln hood dries the coal as it is ground. The mills are rated at 5000 lb. of coal (and moisture) each per hour at a fineness of 88 to 90 percent through 200-mesh. An automatic tempering damper keeps constant the temperature of the primary air and coal entering the kilns.

Coplay Cement Manufacturing Co., Coplay, Penn., was the first cement company to install Whiting unit mills. These mills are of the hammer mill type with the rotor turning on a single vertical shaft that revolves in two water-cooled ball bearings. Coal is fed into the mill by an integral screw feeder, heated primary air is introduced into the pulverizing chamber, and there is a separating chamber. It is said that the coal is pulverized and

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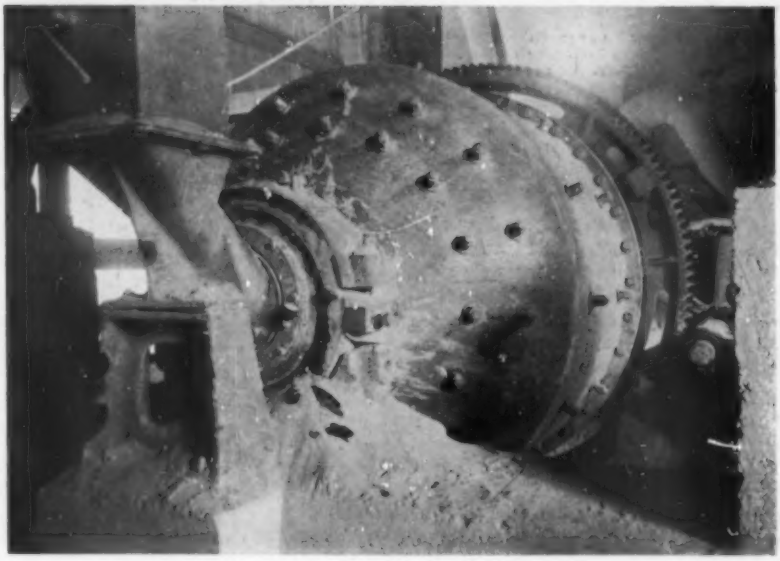
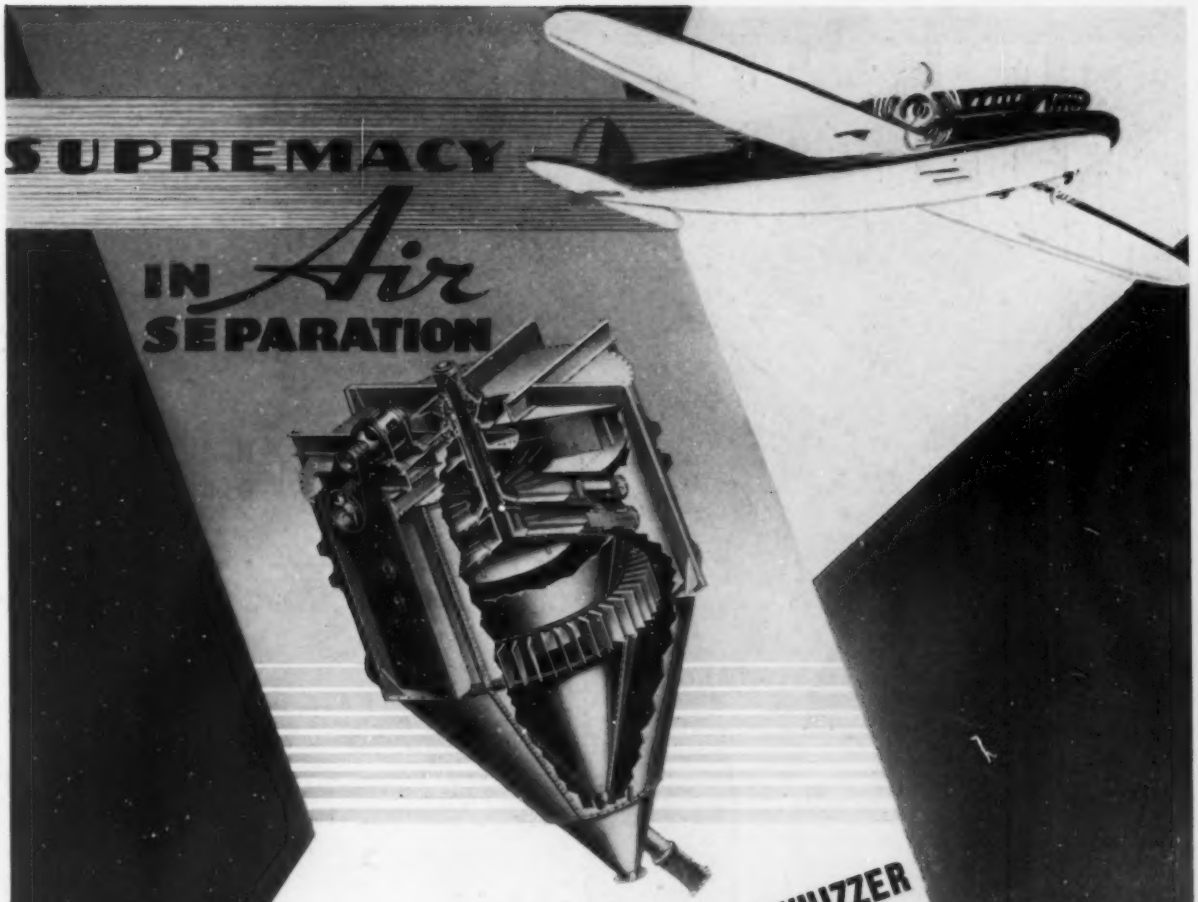
Below: Close up of the ball mill taken from the feed end





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RAYMOND DOUBLE WHIZZER MECHANICAL AIR SEPARATOR

This up-to-the-minute centrifugal classifier combines the many Raymond features which have been developed through a long line of improvements, dating back to the introduction of the Raymond principle of air separation 55 years ago.

The wide range of fineness control available without internal adjustments . . . the narrow limits maintained in particle size of the finished product . . . the extreme high fineness obtainable with relatively larger capacities . . . the proved economy in maintenance . . . are a few of the reasons for the well earned supremacy of the Raymond Mechanical Air Separator.

In these times of urgent production of close specification materials, it is the logical machine for the modern operator to choose.

RAYMOND Laboratory Air Separator — for Running Tests on Powdered Material

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RAYMOND PULVERIZER DIVISION
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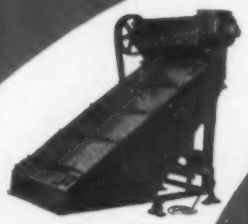
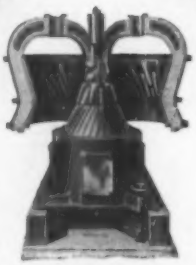
STURTEVANT

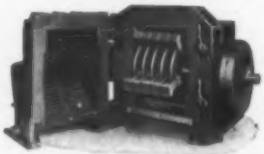
A complete Line of Equipment for the Rock Products Industry



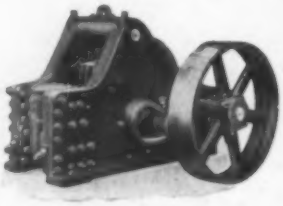
Moto-Vibro Screens



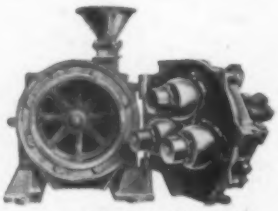
Rotary Fine Crushers



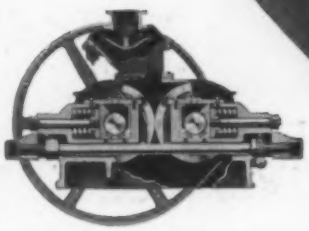
Swing-Sledge Mills



Jaw Crushers



Ring-Roll Mills



Crushing Rolls

AIR SEPARATORS

AIR SEPARATORS for finest separation of dry materials. Range of work 50-350 mesh. Capacities ¼ ton to 50 tons per hour. Large feed opening, steep cones, rigid construction, Ball and Roller Bearings. Small power, low upkeep, easy adjustments. Sizes 3′ to 16′.

304 AIR SEPARATORS sold for cement alone. All on approval—none rejected. Hundreds used for Limestone, Lime, Hydrate, Gypsum, Clay, Refractories, Talc, Soapstone, Coal, Coke, Phosphates, Abrasives, etc., etc.

MOTO-VIBRO SCREENS screen anything screenable. Classified vibrations. Unit construction—any capacity. Open door accessibility. Open and closed models with or without feeders. Many types and sizes—range of work ½″ to 60 mesh.

ROTARY FINE CRUSHERS for intermediate and fine reduction (1″ to ¼″). Open door accessibility. Soft or moderately hard materials. Efficient granulators. Excellent preliminary Crushers preceding Pulverizers. Many sizes. Belt or Motor driven.

SWING-SLEDGE MILLS for coarse and medium reduction (1″ and finer). Open door accessibility. Soft, moderately hard, tough or fibrous substances. Built in several types and many sizes.

JAW CRUSHERS for coarse, intermediate and fine reduction of hard or soft substances. Heavy or light duty. Cam and Roller action. Special crushers for Ferro-alloys. Several types, many sizes.

RING-ROLL MILLS for medium and fine reduction (10 to 200 mesh) hard or soft materials. Very durable, small power. Operate in closed circuit with Screen or Air Separator. Open door accessibility. Many sizes, large or small capacities. No scrapers, plows, pushers or shields.

CRUSHING ROLLS for granulation, coarse or fine, hard or soft materials. Precision and automatic adjustments. Crushing shocks balanced. For dry or wet reduction. Sizes 8x5 to 38x20. Roller or Plain bearings. The standard for abrasives.

STURTEVANT MILL COMPANY

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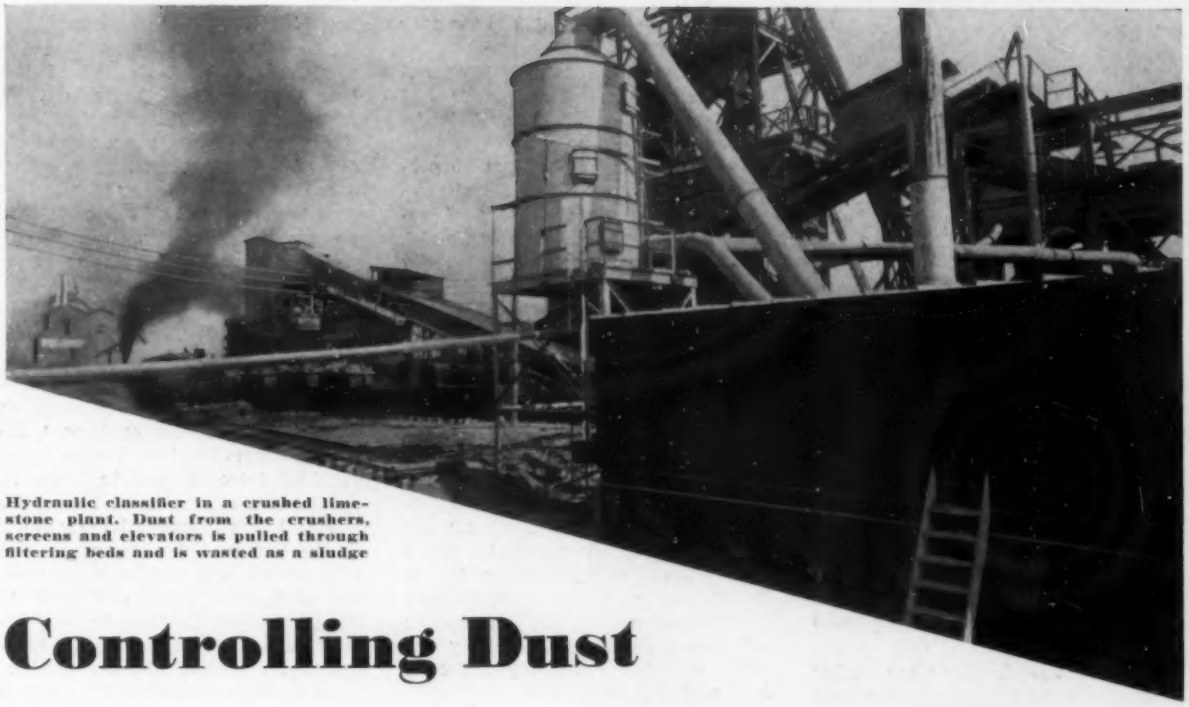
BOSTON, MASS

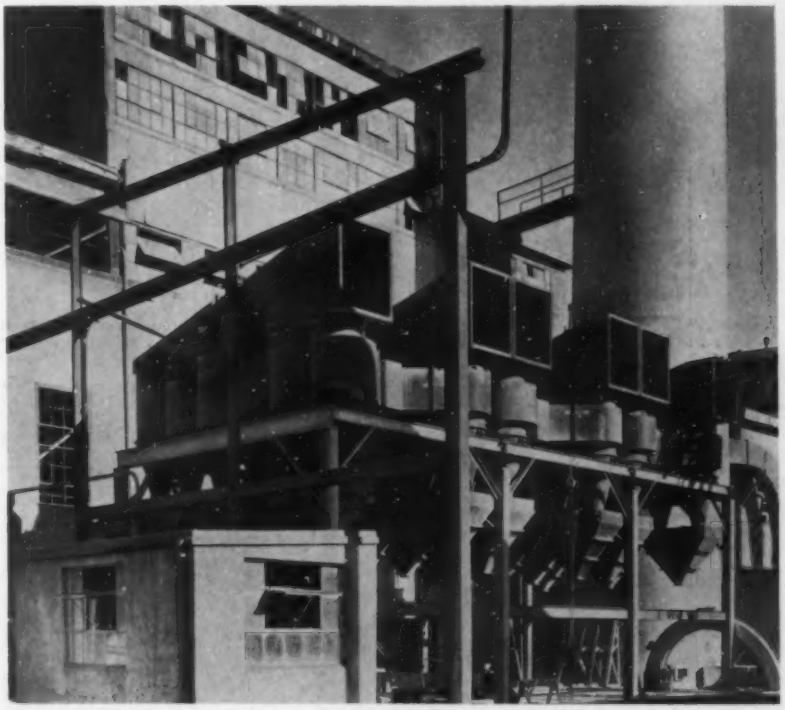


Hydraulic classifier in a crushed limestone plant. Dust from the crushers, screens and elevators is pulled through filtering beds and is wasted as a sludge

Controlling Dust

Recovering valuable by-products and improving working conditions

DUST CONTROL measures in the rock products industries are becoming more numerous and valuable "by-products" are being recovered in dust collectors. Many installations are being made for considerations other than a return on plant investment, even where the dust has little or no value. Even though the dust be limestone or cement, which are not considered unhealthful for an employe, more plant operators are considering its collection desirable.



Battery of 36 cyclones being installed by Dewey Portland Cement Co. to recover stack dust. In serving three kilns, 300,000 c.f.m. of gases at 650 deg. F. will be handled

Prevention of its escape into working areas and collecting it are important parts of any program for safety and welfare. Better working conditions are reflected in more efficient and safer workers. That dusty conditions are disagreeable has been recognized, particularly in some portland cement plants, where collecting equipment is now being installed entirely for the workers' benefit.

State Health Code Stimulates Interest in Dust Collection

Dust collection is becoming more common in crushed stone plants where the rock is definitely non-siliceous and where the installation of dust arresting equipment is not required. The New York State code relating to the control of silica dust in stone crushing operations, scheduled for promulgation July 1, 1942, will likely be taken as a model for other legislation to follow, which will set requirements and standard practices that must be followed by producers.

The code provides for compulsory control of dust in all stages of operation where employes are exposed and sets the equipment standards for dust collection. Maximum allowable dust concentration is 100,000,000 particles

Dust from this collector at the Belle Isle Lime Co. enters a dewntering tank as a sludge and the residue is marketed as a lime putty

per cu. ft. of air for any stone having free silicon dioxide as a component part and containing less than 10 percent by weight of free silicon dioxide. For stone having 10 percent or more by weight of free silicon dioxide the maximum permissible concentration is 10,000,000 particles.

In its provisions are standards for the erection and installation of dust control equipment. Plans showing the location and type of dust-generating operations and the methods of dust control to be employed together with design details must be submitted to the industrial commissioner for approval before installation. It further stipulates that the dust control equipment must be kept in good repair and in clean condition; that the plant itself must be kept in clean condition and that all waste material shall be removed at regular intervals.

As to individual pieces of equipment, it will be required that crushing and grinding mills be enclosed as completely as possible with a negative pressure within the enclosure. Screens will have to be enclosed as much as possible and storage bins must be enclosed with a negative pressure inside the enclosure. Similarly, bucket elevators, conveyors, chutes and loading hoppers must be enclosed and ventilated with a fixed volume of air. It is evident that silicosis, alone, will be subordinated to other considerations and that there will probably come a tendency to outlaw any, or all, dusts.

Enclose All Sources of Dust

A few illustrations are given to illustrate the kind of dust collecting equipment being installed in the rock products industries. Particular attention is called to the types of enclosures used since no system of dust collection can be worth much if the dust is not confined at the source. Some authorities claim that 75 percent of the job of dust control is in the design and construction of enclosures. The Orange Quarry Co., W. Orange, N. J., located inside the city limits adjacent to an exclusive residential district, is a good example of what can be done to prevent the escape of dust and to collect it. The entire main plant is enclosed and, when in full operation, little or no dust escaping is visible to the eye.

Inside the plant, enclosures have been built around all the conveyors, chutes and bucket elevators; hoods have been built for the crushers; and vibrating screens are entirely housed with plywood siding. All the dust is drawn through piping into two bag-type dust collectors. One is a Parsons collector of 30,000 c.f.m. capacity, the other a 20,000 c.f.m. Sly collector, each with a separate fan.

During wet weather the collectors are cut out and the recovery is 20 tons a day during dry conditions, in a plant with a production of 1500 tons of commercial unwashed trap rock in nine hours. An incidental benefit to having a clean plant with favorable working conditions, is that a market has been found for the dust. Dust is bagged and sold principally as an asphalt filler. By enclosing the plant in its entirety and some of the equipment separately, a great deal of noise has been eliminated and the plant is exceptionally quiet for a crushed stone plant.

Lynn Sand and Stone Co., Swampscott, Mass., has done a particularly fine job of enclosing equipment, including some units that are commonly considered too difficult to house in. A complete floor was built over the bins, all screen boxes hopper down to the bins and the screens are totally enclosed. In designing the various enclosures non-interference to operation and maintenance were foremost. Each screen and the bucket elevators, for example, have doors into them through the plywood housing to enable employes to get in and work

Above: Bag-type collector at Volunteer Portland Cement Co. to clean up working conditions around the crushers. Collected dust is wasted

Below: Showing plywood enclosures around a screen and chutes in an Eastern crushed stone plant. Note access door into enclosure and the floor, which encloses the bins below

on the equipment when necessary. Collection equipment consists of two Parsons bag-type collectors. Some of the dust is sold for asphalt filler.

Another illustration herewith is of a No. 10 Norblo hydraulic dust collector in a crushed limestone plant in the East. According to the operator of this plant, the hydraulic dust collector has some advantages, provided a water supply is available to dispose of the dust where there is no market for it. It eliminates handling the dry material and passes it off to waste as a sludge.

The collector illustrated is 10 ft. in diameter, and has two horizontal filtering beds of coke inside, consisting of a 6- to 8-in. depth of 2- to 2½-in. coke resting on two decks of wire mesh. Dust from the various crushers, screens and elevators is pulled through the collector by a fan, under suction, and water sprays wash down the dust that adheres to the coke and the sludge flows by gravity to waste.

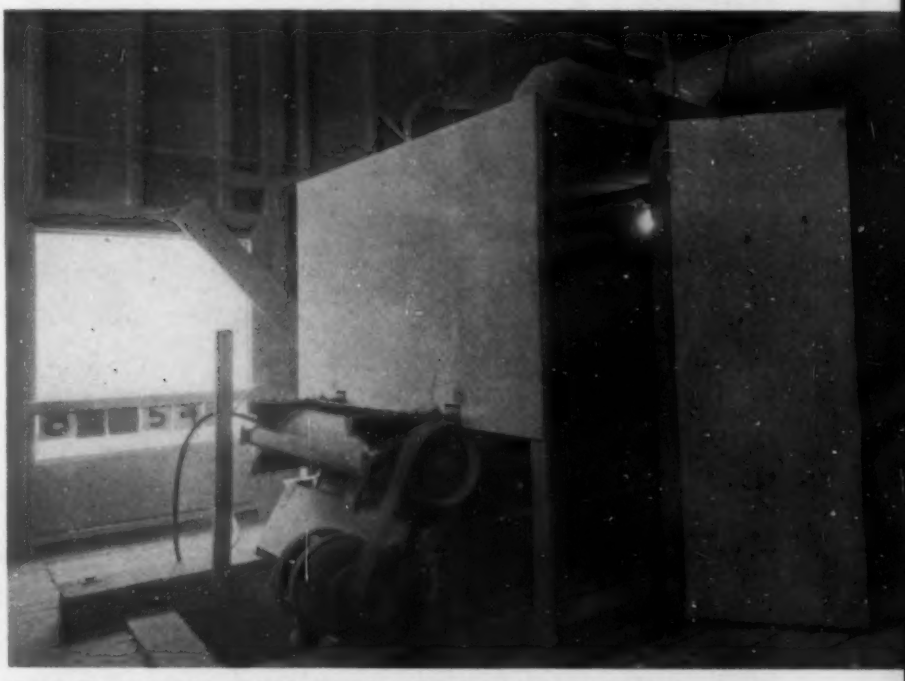
Another illustration of a wet collector in use is the Schneible collector used by the Belle Isle Lime Co., Detroit, Mich. Dust as a sludge is accumulated in a de-watering tank and the residual product is sold as a lime putty.

In the portland cement industry some notable installations are being made of stack dust collectors. Recoveries as high as 150 tons per day are being made, and the dust is returned into the kilns with fresh raw material. The construction view herewith of Buell dust collectors being erected at the Dewey Portland Cement Co. plant at Davenport, Iowa, is representative of a typical cyclone collector installation. When completed, it will handle 30,000 c.f.m. of gases.

Volunteer Portland Cement Co., Knoxville, Tenn., uses a Pangborn cloth-type dust collector between two stone crushers, not to reclaim dust for re-use, but to improve working conditions around the crushers. Recovery is only two tons a day, not sufficient to reclaim into the slurry, which is hauled away to waste.

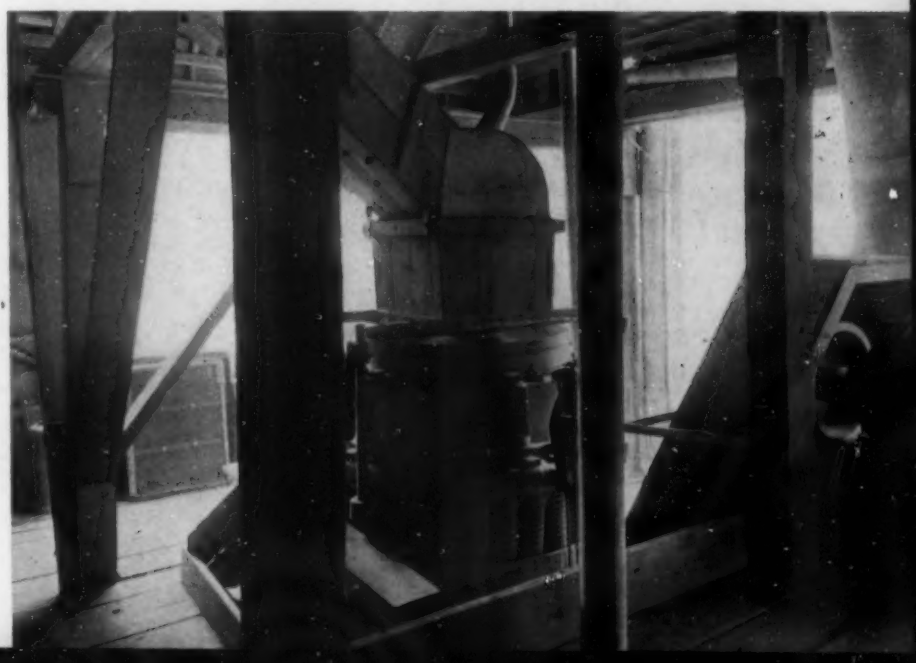
Other parts of cement mills are being made more dust-free, even where the dust recovered has no particular value. Dust collectors are used in some of the newer pack houses to keep the handling machinery under a constant negative pressure to prevent the escape of dust from the system. These are usually bag-type collectors. Grinding circuits in many plants have similar dust collectors, not only to catch dust, but to alleviate pressure that has a tendency to build up in screw conveyors and other handling equipment.

Two large capacity bag-type dust collectors in the trap rock plant of Orange Quarry Co. Screw conveyors beneath them reclaim the dust to a steel bin from which the dust is bagged

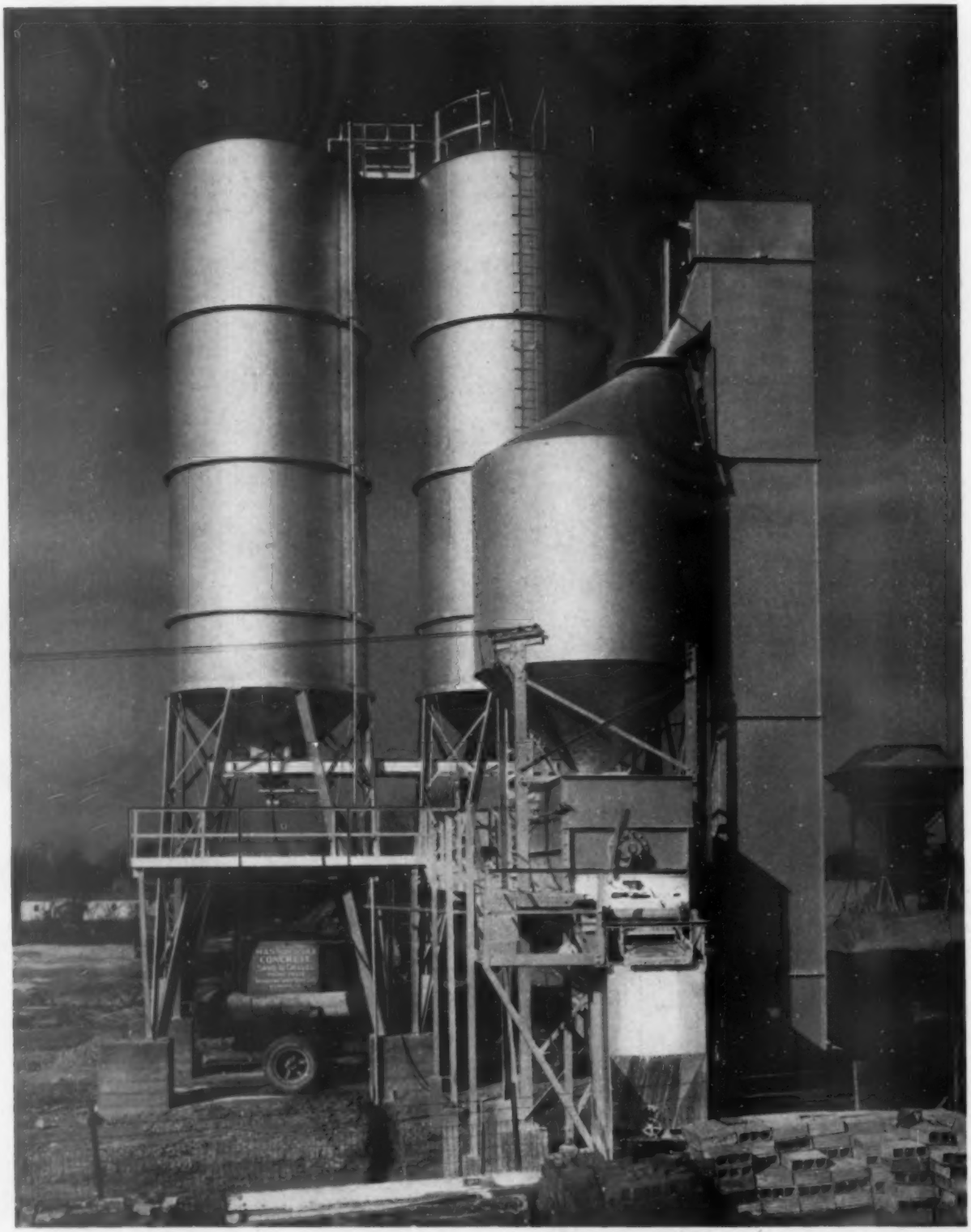


Above: Plywood enclosure built around a vibrating screen at the Orange Quarry Co. plant. Confining equipment this way also eliminates noise

Below: Showing how hoods are built at principal sources of dust generation. This one is on a Symons reduction crusher in the same plant



LIME PUTTY ADDS TO READY MIX PROFITS

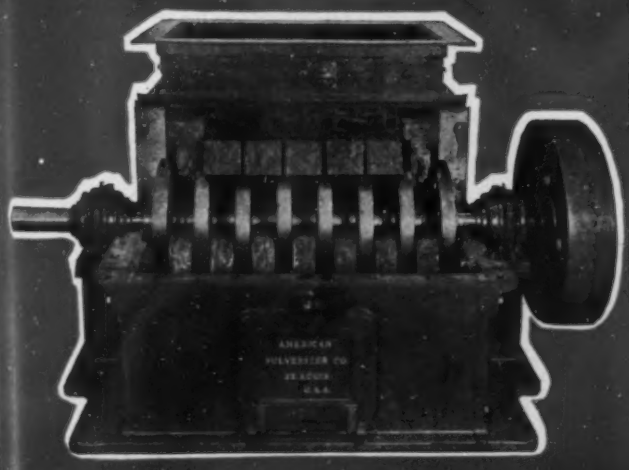


Brooks-Taylor lime putty plant operated by the Massaponax Sand and Gravel Corp. at Richmond, Va. This plant is a standard two-tank slaking and ageing unit built by the Chicago Bridge and Iron Works. Transit mixers from the company's adjoining ready-mixed concrete plant make the mortar deliveries, receiving mortar sand from the batching bin in background and the aged lime putty as shown

AMERICAN

AMERICAN portable crushing plant reducing "run-of-quarry" stone to ¾" aggregate in one reduction at the rate of 200 tons per day.

Front view showing breaker plate adjustment.



Shell cover removed to show rotor.

MAKE EVERY CRUSHING OPERATION A STRAIGHT SHOT AT THE ENEMY

By installing an American Crusher in your plant now you will prepare it for the increased demands for our War Effort, and will assure yourself of consistent production of a uniform product for utmost profit.

Speed and meeting exact specifications are the main requirements in filling the present emergency needs—American Crushers, with advanced engineering, excel in these two features—turning out high quality products day after day with the lowest possible operating costs.

Only carefully selected and tested parts are used in every American Crusher to insure trouble-free service. More than 30 years of experience in building Crushers assures you of getting a superior machine into which is built such outstanding features as Heavy Cast Construction, Cast Steel Adjustable Platen, Cast Steel Discs, Heavy Alloys Steel Shaft, SKF Spherical Roller Bearings and Manganese Lined Crushing Chamber.

Let us show you how an American Crusher will enable you to meet the 1942 requirements at capacities to fill the large orders.

Send your inquiries now.

AMERICAN PULVERIZER CO.

1245 MACKLIND AVENUE ST. LOUIS, MO.

1942 AND YOU..

All indications point to an acceleration in the demand for non-metallic materials.

Right now there is a demand for:

Limestone and lime for steel and metallurgical and chemical industries.

Agricultural lime and limestone.

Silica sand production for foundries and plate glass.

Track sand for coal mines and railroads.

Mica-feldspar, phosphate rock, etc.

And finally, construction materials for military use.

Now is the time to put your house in order. Let us help you solve those dust problems while business is good so you'll be in A-1 shape.

We are now working on projects for:

The Cemento de Mixcoac S. A., Mexico City, Mexico

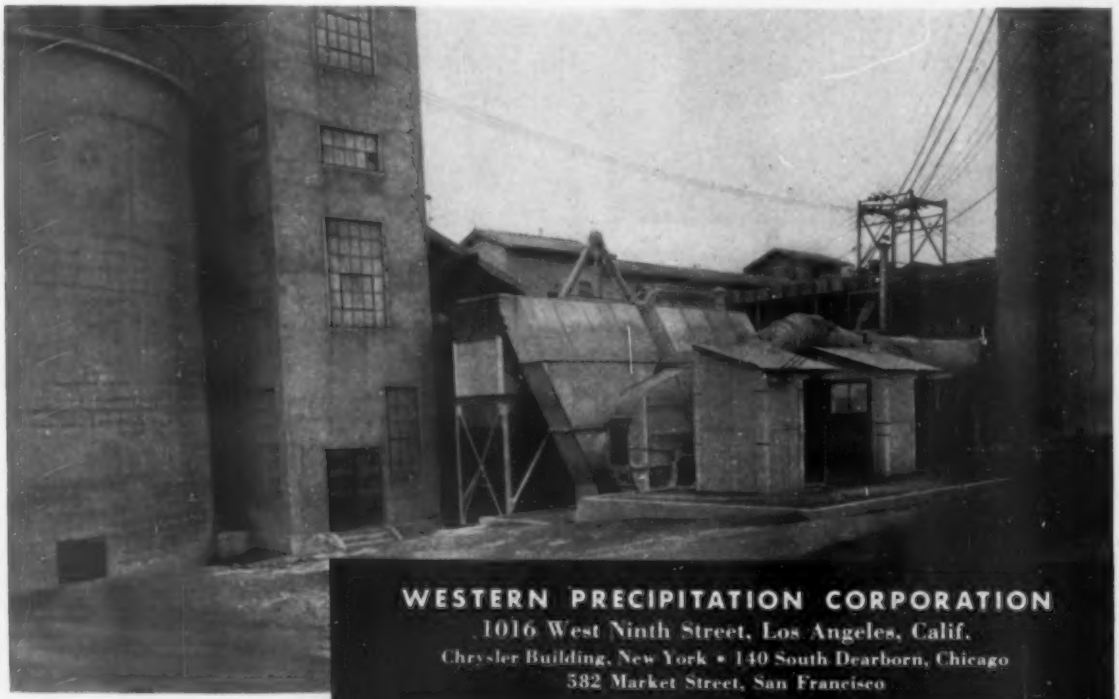
Compania Cemento, Nacional, Rio de Janeiro, Brazil

Northwestern States Portland Cement Co., Mason City, Iowa

Lone Star Cement Corp., New Orleans, La.

California Portland Cement Co., Colton, Calif.

Write us and we'll be glad to have one of our engineers visit your plant.



View of Multiclones used on rotary dryers at cement plant in Texas.

WESTERN PRECIPITATION CORPORATION
1016 West Ninth Street, Los Angeles, Calif.
Chrysler Building, New York • 140 South Dearborn, Chicago
582 Market Street, San Francisco

PRECIPITATION COMPANY OF CANADA
Dominion Square Building, Montreal

Above: Ready mixed concrete batching plant operated by the U. S. Transit Mix Concrete Corporation which furnished 200,000 cu. yd. of ready mixed concrete for construction of the Kanknkee and Elwood ordnance plants near Wilmington, Ill.

Left: Large crushed stone plant of Liberty Limestone Corporation, Buchanan, Va., which has furnished a large tonnage of stone sand for defense projects

Below: Becker County Sand & Gravel Co. plant near Cheraw, S. C., which has produced an enormous quantity of sand and gravel for a defense power project. Note the large open bin storage to meet any possible emergency demands

All - Out for Defense

War conditions have made it imperative that all rock products plants gear their production to the needs of the government

ROCK PRODUCTS industries are in the thick of our all-out program of industrial production for war, producing on an unparallelled scale the materials necessary to build the industrial plants, the roads and other construction so vital to the defense of the United States.

Reproduced herewith is a two page spread, "They Broke All Records," that appeared in the November issue of *Warner-American News*, company-edited house organ of The Warner Co., Philadelphia, Penn. It is intended to drive home to the readers of the publication, who are employes, the important part the company and employes have in helping the government in our national emergency. The photographs show different views of company plants which are operating at 100 percent capacity and also some of the projects being served. Among them are illustrated a naval dry dock that is one of the largest ever built.

Ready Mixed Concrete

Also shown are three plants operated by other companies that represent the ready-mixed concrete, sand and gravel and crushed stone industries and their participation in construction for national defense.

The ready-mixed concrete plant, operated near Wilmington, Ill., by the U. S. Transit-Mix Concrete Corp., an affiliate of the McCormack Transit Mix Concrete Co., New York City, has furnished 200,000 cu. yd. of ready-mixed concrete for construction of the Kankakee Ordnance and Elwood Ordnance plants being built by the War department.

This plant is a large scale example of what has been taking place in the ready-mixed concrete industry during the emergency—the transfer of plant machinery, delivery equipment and key personnel to the sites of large projects where ready-mixed concrete is the answer to the requirements for speed and quality.

The 200-cu. yd. per hour batching plant shipped to Wilmington from New York, N. Y., comprised a 150-cu. yd., 3-compartment steel bin and a 6-cu. yd. weigh batcher with a 4-beam scale. Supplementing this plant was a new belt conveyor to transfer aggregates direct from hopper-bottomed cars into the bin and a new bulk cement storage bin. Aggregates were shipped direct from the stockpiles of the Chicago Gravel Co. at Rockdale, Ill.

Many other ready-mixed concrete producers have been doing the same thing, but in most instances the tonnages involved and the plant capacities are much less.

Sand and Gravel

Another illustration shows the sand and gravel plant operated by Becker County Sand and Gravel Co., a Minnesota concern, at Cheraw, S. C., to furnish aggregates for the Santee-Cooper Power and Navigation Project.

This $41,000,000 project, located within 50 miles of Charleston, S. C., is one of several government-financed power and navigation projects under construction before the war began that have since assumed the status of defense projects. Santee-Cooper is of major importance as a source of power for industrial plants and, when completed, the construction will require about 1,000,000 tons of aggregates. The bulk of the tonnage is going into the building of Santee dam and Pinopolis dam, both of earth-fill construction, and into the construction of concrete spillways, locks and power houses.

Capacity of the plant is 200 tons per hour. Operations are on two 10-hr. shifts and shipments average 50 standard railroad cars a day.

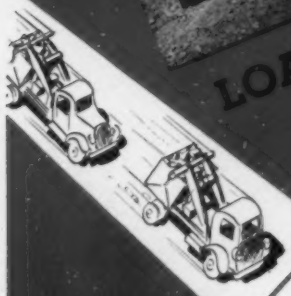
Crushed Stone

Cherokee dam, one of the T.V.A. series of concrete structures, has just been completed near Knoxville, Tenn. Its value, as a defense project, is as a source of electrical power for the production of aluminum. Birmingham Slag Co., Birmingham, Ala., had the contract for the aggregates and furnished about 1,000,000 tons of crushed stone from a plant near Knoxville that was leased and enlarged to a capacity of 400 tons per hour. As a subcontractor, American Limestone Co., Knoxville, furnished 400,000 tons of manufactured stone sand for the fine aggregate. A special plant was built.

The plant of Liberty Limestone Corp., Rocky Point, Va., enlarged its production of stone sand and delivered as much as ten carloads a day average of stone sand for a long period of time to government construction projects. The U. S. Army powder plant recently completed at Radford, Va., was one of the projects served. The sand was manufactured by three rod mills closed-circuited with a mechanical air separator.

One of the western gypsum mines which has been working at top speed to supply material for wallboard in defense housing

Keep 'em Moving!



TRADE DEMPSTER DUMPSTER MARK
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BucKeTrux

More trips—fewer trucks—less cost to you and peak production schedules maintained—that is the advantages of using Dempster-Dumpster-BucKeTrux.

Detachable Buckets to cut loading and hauling costs means that your trucks are in transit while other buckets are continuously being loaded, no waiting—and one truck unit serves five to ten buckets. Flexibility of your truck and 'DUMPSTER' can be further increased by installing a Dempster Crane Boom: also, combination cargo and transport body for additional services.

The Standard Dempster-Dumpster Truck Unit handles Drop-Bottom, Skip and Tilt Type Buckets interchangeably. Net payloads of 4500 lbs. to 12000 lbs. Sizes 1½ to 4 cu. yds. for the heaviest materials.

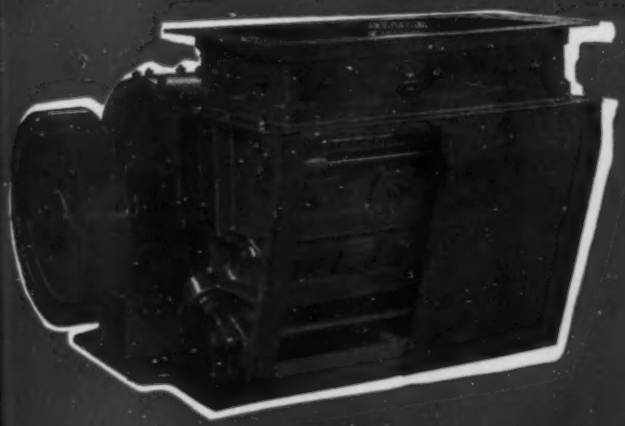
Dempster-Dumpster-BucKeTrux are truly filling an important role in speeding up production in our War Efforts—now is the time to cut the loading and hauling costs in your plant—investigate today.

DEMPSTER BROTHERS, INC.

Knoxville, Tennessee

AMERICAN

AMERICAN portable crushing plant reducing "run-of-stone to ¾" aggregate in one reduction at the rate of 200 tons per day.



Front view showing breaker plate adjustment.

Quick access to interior for repair work.

MAKE EVERY CRUSHING OPERATION A STRAIGHT SHOT AT THE ENEMY

By installing an American Crusher in your plant now you will prepare it for the increased demands for our War Effort, and will assure yourself of consistent production of a uniform product for utmost profit.

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Send your inquiries now.

AMERICAN PULVERIZER CO.

1245 MACKLIND AVENUE ST. LOUIS, MO.

The Dredging Plant. Daylight view of Dredge "Valiant," pictured on cover. A floating plant, new, all-steel, it eats away at raw-gravel bank, as tug "Vanguard" noses in to take a loaded barge across lake to Van Sciver Plant. On the dredge day-shift are Captain Andy Kish, William Knotts, Al Doster and Ralph Linck. Below—Barge and tug arriving at Van Sciver after more than half-mile trip. Tug Captains, day-shift: Pierson Burton, John Cutchineal. Night: Warner Bostic, Joseph Cutchineal.

Day and night shifts both, of Van Sciv
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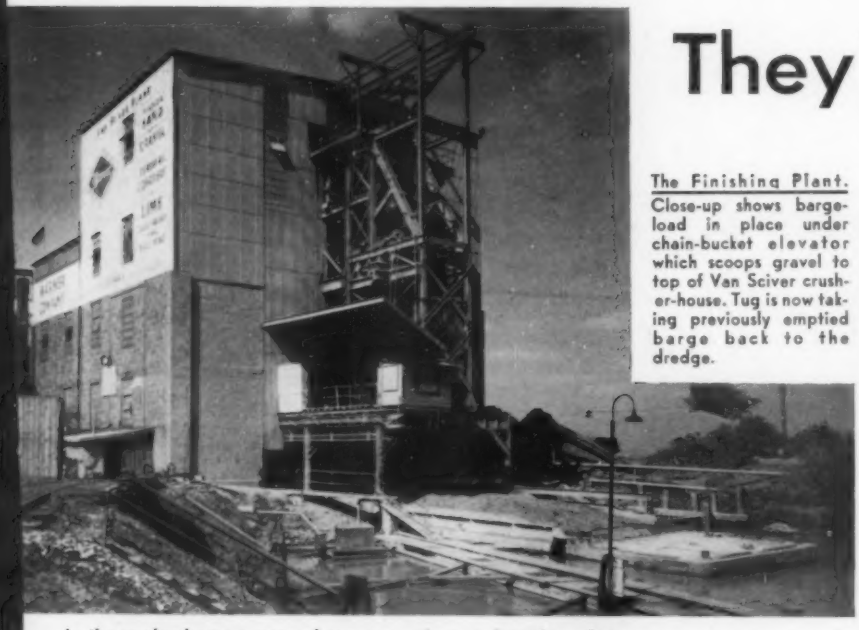


The Finishing Plant. Close-up shows bargeload in place under chain-bucket elevator which scoops gravel to top of Van Sciver crusher-house. Tug is now taking previously emptied barge back to the dredge.

In the crusher-house a maze of screens, washers, and crushers clean, size, and grade sand and gravel as they travel by conveyor belt, bucket elevator, and gravity down through the plant and out the back to bins above railroad cars, and to large stock piles. Day-shift crusher-house foreman: Dennis Cavin. Night: Raymond Dick. Day yard foreman: Charles Robertson. Night: Joseph Morgan.

The Warner Railroad. Standard-gauge railroad hauls assorted sand and gravel five miles across country to Terminal Plant located on the Delaware below Trenton. Day engineers: Mike Kish, Frank Cutchineal. Night: William Sweeney and Irwin Baker.

f Van Sciver and Terminal Plants, of the tugs, barges, dredge, railroad, and maintenance, pose in toto for group photo. General Superintendent F. K. Wills in circle.

Terminal Washing Plant. Sand from R.R. hopper cars drops directly into 1000-ton river barges. Gravel goes up this conveyor belt slope, is washed again before loading into barges. Charles F. Johnson, foreman day-shift. Arthur Yount, night.

Towing down Delaware. Tugs haul barges 25 miles down stream to Philadelphia yards, 60 miles to Wilmington yards; or Chester; or direct to customer; or to huge Federal Defense projects. Masters of main river tugs are Clarence Chamberlain, Charles Darby, Charles Wheeler. Marine Superintendent is B. M. Thomas. Below—Arriving at Berks St. Yard, Philadelphia, sand and gravel are scooped from barges by crane buckets, stored in bins for truck delivery, manufactured into Central-Mix Concrete.

oke All Production Records!

Hundreds of **Thousands of Tons** *for Defense*

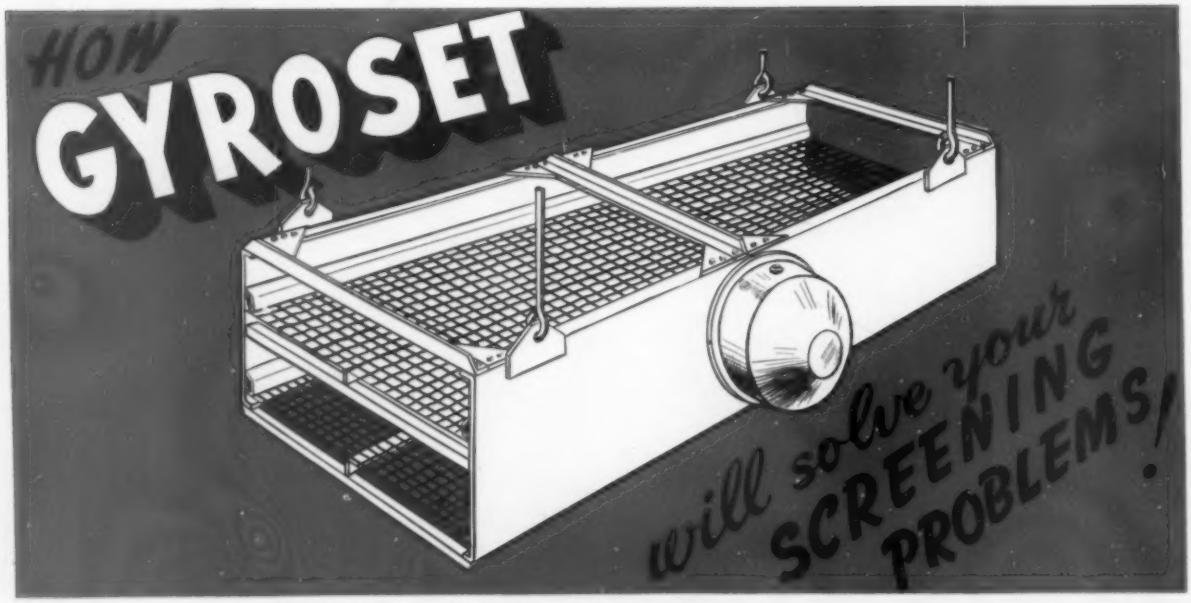
WHEN THE FEDERAL EMERGENCY DEMANDED MORE SAND AND GRAVEL QUICKLY— than had ever before been produced in the history of the Company quickly—something had to be done—quickly. First reaction was "Impossible!—Men, machinery, management, are not equal to it. The requirements are terrific." But there was no time to ponder the situation.

A meeting of the Van Sciver organization was called. There the big problem was pointed out—our patriotic duty to take care of the Federal Emergency work in this area. The spirit with which the organization took hold of the job and "went over the top" in fine stride are big factors in the year's unprecedented accomplishment for National Defense.

Fortunately, too, improvements had steadily been made on machinery since 1929. The ancient bug-bear of breakdowns had been gradually conquered beforehand. But the cooperation of men and management, and the coordination — plant to plant, stand as a monumental achievement which made possible the record—twenty-four hours from raw material to Defense Projects.

The Concrete Plant at Berks St. Sand and gravel to be made into C.M.C. are conveyed to top of this plant. Warner trucks pull into position below, load, and are off to the job. H. J. Whitten is General Superintendent, Philadelphia Yards.

Mighty Battleship Drydocks at Philadelphia Navy Yard. Thousands of tons of sand and gravel supplied here by Warner for unique under-water placement of concrete. Only 24 hours from dredging of raw materials to delivery to this giant Federal Emergency structure!



■ Here's a machine that will efficiently grade or size your material at the lowest possible cost —not only is it popularly priced but economical in operation as well.

The secret of its amazing performance is in the positive CONTROL of the vibrating action which permits a light vibration for fine material or a coarse, heavy throw for large material either wet or dry. You can adjust the machine to exactly fit the product in hand and do it easily and quickly without special tools. Available in one, two or three decks; open, semi-enclosed or fully enclosed models.

GYROSET is produced by men who have specialized in the design and manufacture of vibrating screens for years.

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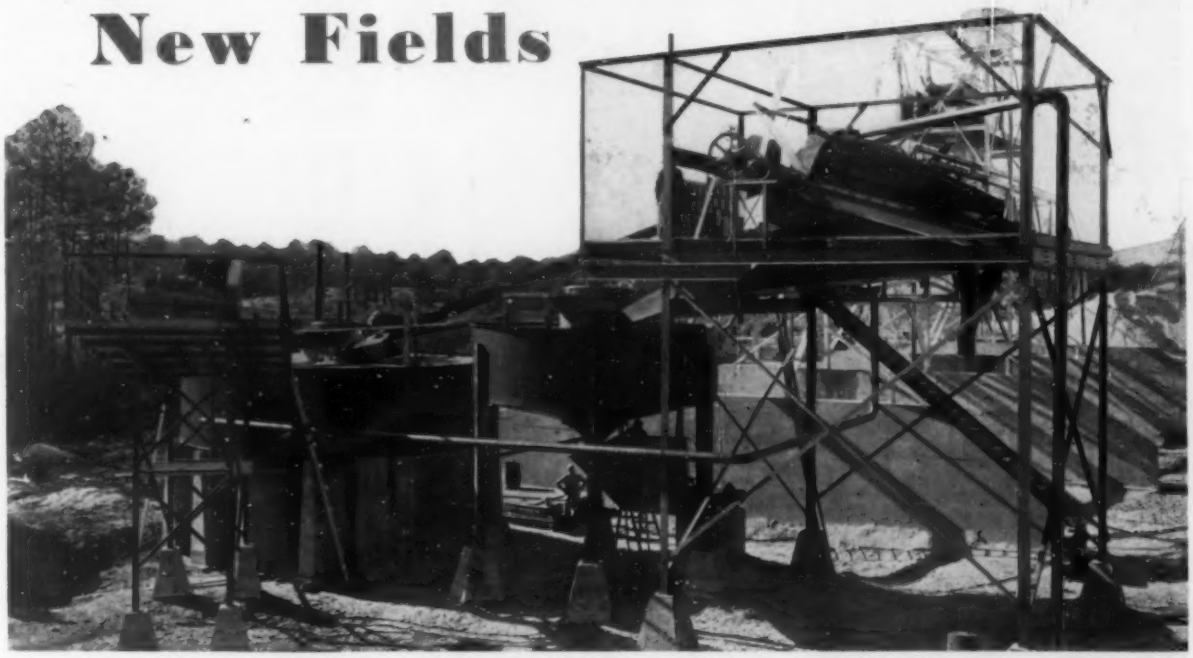
OIL LUBRICATION
—Vibrator assembly is completely enclosed and all moving parts operate in a continuous bath of oil.
FLOATING SHAFT
—one that is really full floating—it carries no radial load, therefore no bending.
STROKE ADJUSTMENT
—complete throw adjustments can be quickly made without special tools or parts.
SAFETY
—built-in—all moving parts of Vibrator assembly are fully enclosed—no exposed fly-wheels to catch the hands or clothing of operator.
SCREEN CLOTHS
—can be easily and quickly changed—avoiding costly shut-downs.
The GYROSET has POSITIVE "ECCENTRIC ACTION" (Not Offset weight!)
Action imparted through the use of simple compound eccentric balance wheels so is not affected by load or rate of feed.
PRODUCTIVE EQUIPMENT CORP.
2926-28 WEST LAKE ST. .....CHICAGO, ILL.
MAKERS OF THE FAMOUS "JIGGER" "SELECTRO" "MUD HOG" SCREENS

Separation Processes Enter New Fields



New foundry sand plant of Whitehead Brothers Co., Dividing Creek, N. J., which produces five washed and closely sized products. Fahrenwald sizer may be seen in background, upper right, where size splits are made. Four classifiers discharge into the open bins and the thickener and classifier on left make a fine core sand

CLASSIFICATION of rock products materials is becoming a more active subject all the time. Classification into sizes, or divisions, under controlled conditions is one answer to strict specifications on sand gradation, for example. Classification is also counted upon to make a division of materials, one from another, and there are some notable installations for that purpose. Quality specifications and the desire to beneficiate certain materials, otherwise worthless, are back of the more modern plants equipped for the purpose.

In the production of natural sand for concrete, the trend is decidedly continuing in the direction of more fines, up to 15 percent minus 50-mesh and four or five percent through 100-mesh. For the construction of Cherokee dam near Knoxville, Tenn., 15 to 30 percent of a manufactured sand had to pass a 50-mesh and 8 to 13 percent a 100-mesh sieve. Some of the newer specifications call for certain percentages of material between as many as seven sieve sizes, and for uniformity within the tolerance limits.

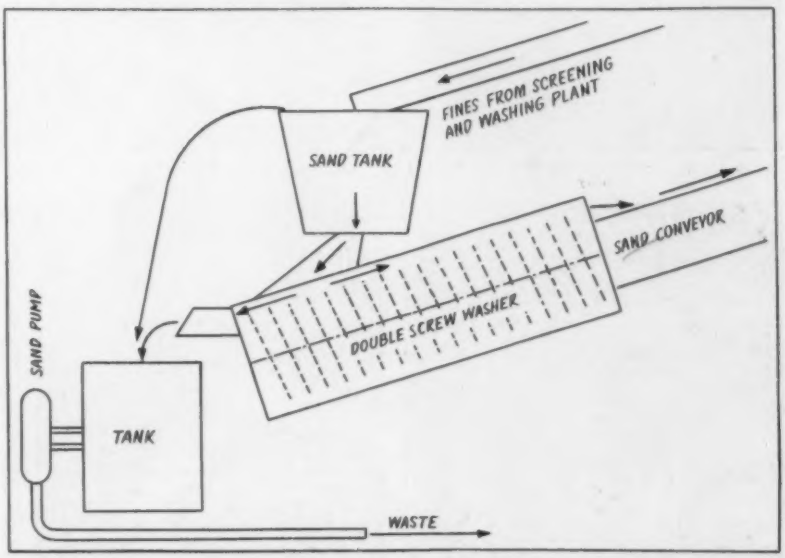
Classifying Moulding Sands

A good illustration of up-to-date size classification practice is the new sand plant of Whitehead Bros. Co. at Dividing Creek, N. J. This plant was designed to produce five separate washed and graded moulding sands at the rate of 40 to 50 tons per hour. Equipment was furnished by the Dorr Co.

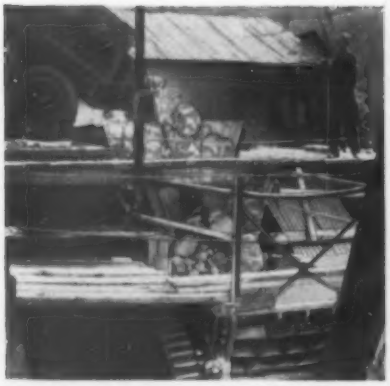
Pit run material is first screened for the removal of gravel and is then de-silted. De-silted sand is pumped to a Fahrenwald sizer which discharges several closely-sized fractions of sand to four Dorr classifiers which discharge into four open bins. Very fine sand rejected from the several operations is recovered in a thickener and is then washed and de-watered in a Dorr classifier to become a fine core sand.

Flotation

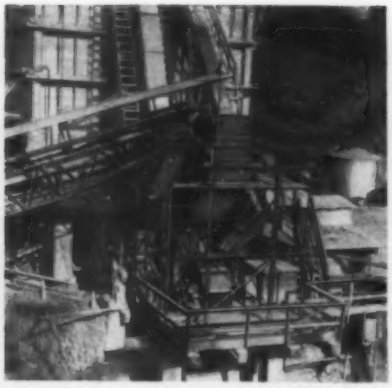
Froth flotation of mica concentrates as fine as 60 percent minus



Installation made at Cooley Gravel Co., Chillicothe, Mo., for recovery and dewatering of fine sand in a part of the plant where there was little head-room and generally crowded conditions



Feeder, primary roll and secondary crusher (not shown) in midwestern limestone plant



Primary and secondary single and double rolls on western limestone

Heavy duty logs in western sand and gravel plant

Giant scrubber and screen on limestone

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Now is the time to equip your plant with dependable McLanahan equipment for more All-Out War business. McLanahan offers a complete line of pit, mine and quarry equipment known throughout the world for its high quality and dependable performance. Features taken from our knowledge of many years of practical plant operating conditions are built into every piece of McLanahan equipment assuring you of efficient production of high quality products. Typical installations of time-tested McLanahan equipment are shown.

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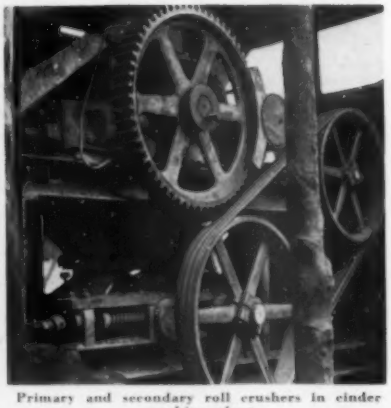
Originators of Single Roll Crushers and Steel Log Washers

HOLLIDAYSBURG PENNSYLVANIA

Three heavy duty logs on Alaskan gold bearing clay

Crusher, elevator and vibrating screen on lime

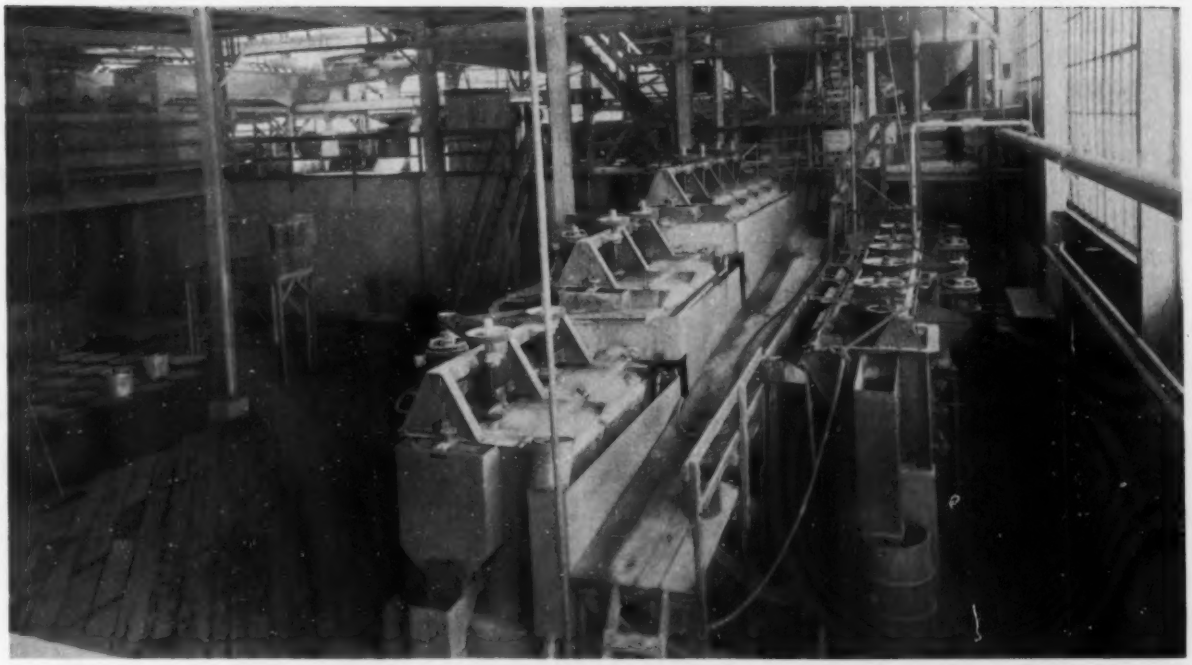


Primary and secondary roll crushers in cinder crushing plant

Roller grizzley removing dirt and fines

Twin revolving screens on limestone

78" heavy duty reciprocating feeder



Flotation equipment in the Kaolin, Inc. plant at Spruce Pine, N. C., to separate fine mica particles from quartz and clay. Either row of cells (14 in all) can be operated separately or both, at peak capacity

200-mesh, to separate the fine particles from quartz and clay, is a development of comparatively recent date in the mica industry. Illustrated herewith are the flotation cells operated by Kaolin, Inc., Spruce Pine, N. C. (now under lease to the Harris Clay Co.).

One row of cells consists of six 32- x 32-in. Denver Sub-A cells, the other of eight 42- x 42-in. Minerals Separation Process Air Flow cells, arranged to operate as roughers, cleaners and re-cleaners.

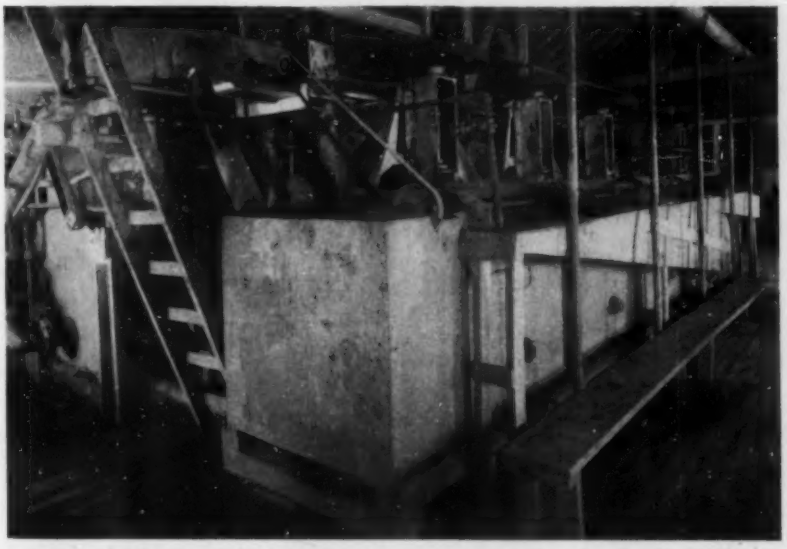
A variety of reagents are finding acceptance in the process. Among those used are duPont DP243 and Armour Amines which are organic collectors, "Yarmour F" pure oil frother, a "soap" collector under license from the Phosphate Recovery Corp. and others.

Coarse mica is recovered in this plant by wet screening, and intermediate sizes by a combination of hydraulic classification and tabling. These types of equipment are the modern means of recovering as much as possible of a by-product which must be removed in producing high grade kaolin for the ceramic industries.

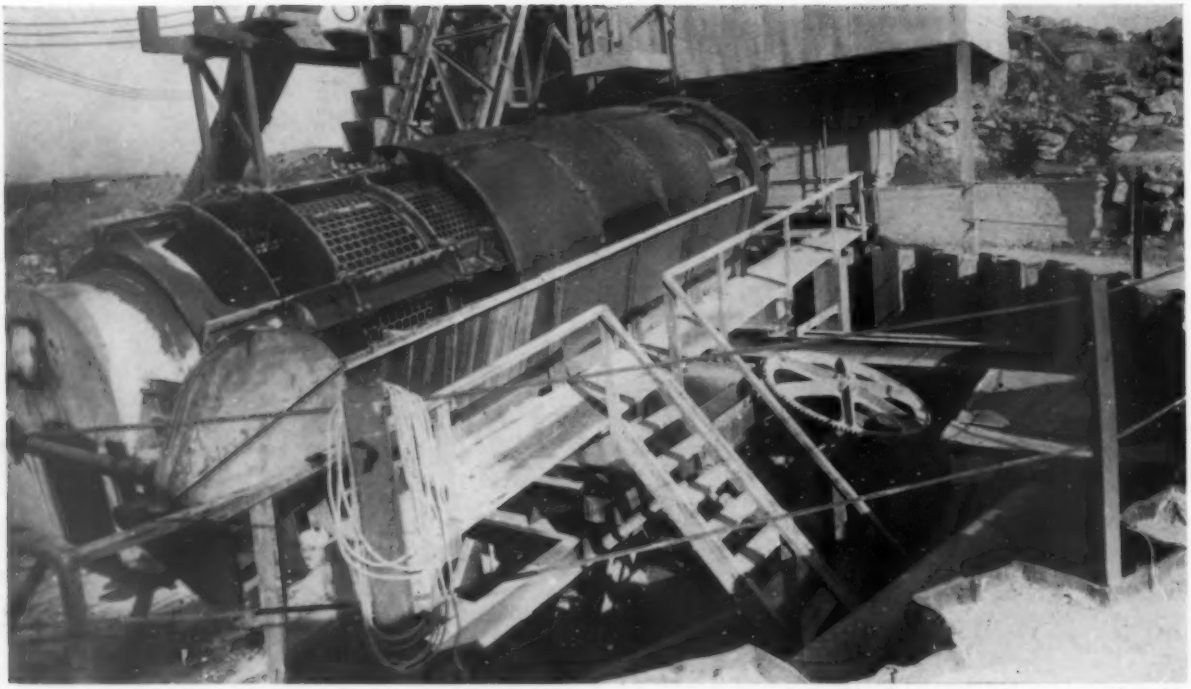
Outstanding in the flotation of cement raw materials by the Breerwood process is the National Portland Cement Co. plant at Brodhead, Penn. A new mineral separation plant was built to use a combination of centrifugal sedimentation and froth flotation, for the first time commercially, to make corrections of raw mixtures. The process plant was designed by the Separation Process Co. in coöperation with F. L. Smidth & Co.

In addition to the first use of a centrifuge for making an actual composition correction, the plant is the first to use flotation concentration and removal of graphitic carbon prior to the concentration of lime and has accomplished the first successful flotation concentration of any mineral of such fineness as to be properly called a "slime."

Tube mill slurry to be processed is classified by an F. L. Smidth vertical centrifuge into a fine and a coarse fraction, the split being made at about 15 microns. The operation of the centrifuge is controlled so that the undesirable proportion of clay minerals is concentrated in the finer fraction, or "effluent" of the centrifuge, thus raising the lime content in the coarser fraction to about ordinary composition. The finer fraction is fed to flotation to produce a concentrate of about



Battery of Denver "Sub-A" flotation cells in the phosphate plant of the Charleston Mining Co., Inc., at Mount Pleasant, Tenn. Minus 30-mesh plus 125-mesh feed material is treated by flotation



Unusual installation in Arundel Corp. plant near Baltimore, Md., of Telsmith scrubber-screen for separating out sand and oversize gravel before handling further through plant. On lower right is Dorr sand washer

85 percent $CaCO_3$. Kiln feed is a mixture of centrifuge cake, flotation concentrates and unprocessed slurry.

According to a recent U. S. Bureau of Mines report gypsum can be floated from silica successfully with the fatty acids, the fatty-acid soaps and other anionic reagents such as the long-chain alkyl sulfates. Thus far, however, no serious attempt to use such methods has been made because of the large amount of high-grade gypsum available.

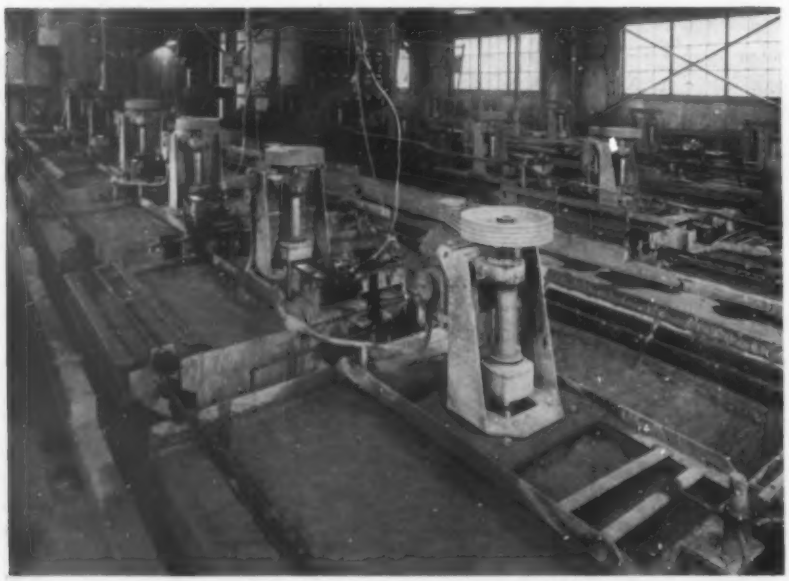
Electrostatic Concentration

The first installation on a commercial scale for the electrostatic concentration of phosphate rock is in operation at the American Agricultural Chemical Co., Pierce, Fla. In this process, developed by the Ritter Products Corp., the mineral particles in a static electric field of high potential electricity are, according to their character, positively or negatively charged. The particles can then be separated somewhat as in magnetic separation. The process seems to have possibilities for cement manufacture.

Air tabling for the separation of mica from residual sand at the Victor Mica Co. plant, Spruce Pine, N. C., is an unusual way of making a dry separation of materials. Dried mica is first screened over a Day Ro-Ball sifter No. 82 which is a 40-in. by 10-ft. double-deck enclosed screen. No sand is contained in the plus 8-mesh material from this screen. A separation is made of the finer material into 14-mesh to 8-mesh size which becomes the feed to one air table and minus 14-mesh which is processed over a second air table.

The air tables were manufactured by Sutton, Steele and Steele, Inc., and look very much like the ordinary concentrating table. A uniform blast of air from a fan below, through gaberdine cloth, separates the mica from the sand. Specific gravities of the two materials do not differ much, but the shape of the mica and its tendency to float on air permits a separation by controlled amounts of air. Sand is caught in riffles and the mica comes off the table as a finished product ready for grinding. The separation is controlled through an adjustable damper on the air lines from

(Continued on page 103)



Interior of cell house at National Portland Cement Co., showing three rows of six flotation machines. Agitated storage tank for flotation cell feed is at left in background and the centrifuge and reagent preparation equipment on balcony

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1872

EAGLE Machinery for processing Sand and Gravel can be relied upon for maximum production in supplying these essential materials for defense construction work.

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Roquemore Gravel & Slag Co., Montgomery, Ala.

ARIZONA

W. E. Boundaurant, Winslow ,Ariz.

ARKANSAS

Arkhola Sand & Gravel Co., Fort Smith, Ark.
Calhoun Gravel Co., Harrell, Ark.
Cross County Gravel Co., Little Rock, Ark.
Hermitage Gravel Co., Box 1147, Little Rock, Ark.
Cross County Gravel Co., Pine Bluff, Ark.

COLORADO

Fountain Sand & Gravel Co., 410 E. 8th St., Pueblo, Colo.
Pueblo Sand & Gravel Co., Box 1026, Pueblo, Colo.

GEORGIA

A. P. Green Fire Brick Co., Box 122, Clarkesville, Ga.
C. M. Lyle Construction Co., Gainesville, Ga.
Mickaolin Company, Holly Springs, Ga.
Cornell Young Co., Macon, Ga.
L. S. Fowler, Milledgeville, Ga.

ILLINOIS

Concrete Materials Co., Byron, Ill.
Marquette Cement Mfg. Co., Marquette Bldg., Chicago, Ill.
Central Materials Co., Decatur, Ill.
Decatur Hydraulic Sand & Gravel Co., Decatur, Ill.
E. C. Risley Sand Co., Box 151, Dixon, Ill.
Mr. Walter J. Ehrler, Galena, Ill.
Mt. Carmel Sand & Gravel Co., Mt. Carmel, Ill.
McElwee & Rogy, Peoria, Ill.
Swords McDougal Co., Peoria, Ill.
Rock Island Sand & Gravel Co., 118 20th St., Rock Island, Ill.
Buckhart Sand & Gravel Co., 726 S. 15th St., Springfield, Ill.
Clear Lake Sand & Gravel Co., 113 E. Washington St., Springfield, Ill.
Sangamon River Gravel Co., 620 W. Edwards, Springfield, Ill.
Earl Walker Co., Sullivan, Ill.
Mr. Dan L. Burtschi Sand & Gravel Co., Vandalia, Ill.

INDIANA

Concrete Silo Co., Mr. Walter Bassert, Bloomfield, Ind.
Bedford-Nugent Co., Evansville, Ind.
Cooley Gravel Co., Gosport, Ind.
White River Materials Co., Hazleton, Ind.
Brown Huffstetter Material Co., Kentucky Ave. & Reisner St., Indianapolis, Ind.
Marion Gravel Co., Marion, Ind.
E. T. Slider, Inc., 201 E. Market St., New Albany, Ind.
Chas. England Gravel Co., Plainville, Ind.
Smelser Hoffman So., South Bend, Ind.
South Bend Sand & Gravel Corp., 3113 Lincoln Way, W., South Bend, Ind.
Mid-West Rock Products Corp., Spencer, Ind.
Sturm & Dillard Co., Syracuse, Ind.
Tell City Sand & Gravel Co., Tell City, Ind.

IOWA

Markey River Sand Co., Bo...
Bellamy Sand & Gravel Co., ...ville, Iowa.
Coon Valley Gravel Co., ...
Moines, Iowa.
Des Moines Sand & Fi...
Des Moines, Iowa.
Flint Crushed Gravel Co., ...
Des Moines, Iowa.
Keefner Sand & Gravel ...
9th St., Des Moines, Io...
M. O. Weaver, Inc., ...
Moines, Iowa.
Concrete Materials Co., ...
Deep Rock Sand and ...
Dodge, Iowa.
Concrete Materials ...
Iowa.
Concrete Materials Co., Bu...
Baker & Patton, Indepe...
Hawkeye Materials Co., ...
City, Iowa.
Northwestern Gravel ...
Empire Sand ...
town, Iowa.
Gersdorf Sand ...
town, Iowa.
H. ...
Marco ...
...
...struction Co., Protovin, Iowa.
Flint Crushed Gravel Co., Tama, Iowa.
Concrete Materials Co., Wallingford, Iowa.
Concrete Materials Co., Waterloo, Iowa.
Waterloo Dredging Co., 85 W. Mullin Ave., Waterloo, Iowa.
John Dorweiler Sand & Gravel Co., West Bend, Iowa.

KANSAS

Mr. D. H. Hardman, Alton, Kans.
More Sand Co., Junction City, Kans.
Hansen Lumber Co., Logan, Kans.
Putnam Sand Co., Salina, Kans.
Kansas Sand Co., Curtis & Tyler Sts., Topeka, Kans.
Victory Sand & Stone Co., Topeka, Kans.

KENTUCKY

Louisville Sand & Gravel Co., 1411 High St., Louisville, Ky.
River Sand & Gravel Co., 701 E. 2nd St., Owensboro, Ky.
Federal Materials Co., Paducah, Ky.

LOUISIANA

Rapides Gravel Co., Alexandria, La.
Amite Sand & Gravel Co., 1445 Florida St., Baton Rouge, La.
Caimes Construction Co., Louisiana Bank Bldg., Baton Rouge, La.
Amite Sand & Gravel Co., Leesville, La.
Jahncke Service Inc., 814 Howard Ave., New Orleans, La.
Gifford Hill & Co., Inc., Turkey Creek, La.

MICHIGAN

Battle Creek Gravel Co., Battle Creek, Mich.
Jacob W. Hobeck, Holland, Mich.
Koenig Coal & Supply Co., Plant B. Oxford, Mich.
Tecumseh Gravel Co., Tecumseh, Mich.

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Hallett Construction Co., Crosby, Minn.
Owatonna Cement Tile Co., Owatonna, Minn.

MISSOURI

...Co., ... University Ave., ...Minn.
...& Gravel Co., Mr. John ...Winona, Minn.
...Co., ... N. Y. Life Bldg., ...
...Co., ... Grand Ave., Kansas ...
...Gravel ... Louisiana, Mo.
...Sand ... 202 W. Francis St., ...Louis, Mo.
...Gravel Co., 2920 Maga... St. Louis, Mo.

MONTANA

... Greenough, Mont.
...Livingston, Mont.

NEBRASKA

... Sand & Gravel Co., Omaha, ...

NEW JERSEY

... 532 Washington St., ...

NEW YORK

... Elliott Square Bldg., ...
... Gravel Co., Dunkirk.
... Co., Mr. F. H. ...
... Inc., Newport, N. Y.
... Iron Corp., ...
... Co., Port ...
... Co., Sparkill, N. Y.

NORTH CAROLINA

Clyde Reed, Jr., Sand Plant, Asheville, N. Car.
Fletcher Limestone Co., Fletcher, N. Car.
Southern Mica Co., Franklin, N. Car.
Marshall Sand Co., Box 217, Marshall, N. Car.
Grove Stone & Sand Co., Seannanoa, N. Car.

NORTH DAKOTA

Butler Construction Co., Grand Forks, N. Dak.

OHIO

Mr. C. C. Carter, 1649 E. 51st St., Ashtabula, Ohio.
White Gravel Co., Camden, Ohio.
Sturm & Dillard Co., Circleville, Ohio.
Newburgh Sand & Gravel Co., 3545 E. 159th St., Cleveland, Ohio.
Ohio Building Material Co., Cleveland, Ohio.
Minnesota Mining & Mfg. Co., Copley, Ohio
Hurst Sand & Gravel Co., N. Findlay St., Dayton, Ohio.
Zanesville Gravel Co., Dresden, Ohio.
Hamilton Gravel Co., Mr. W. P Watson, Hamilton, Ohio
Hugo Sand Co., Kent, Ohio.
Kinsman Sand & Gravel Co., Kinsman, Ohio.
Middletown Sand & Gravel Co., Box 269, Middletown, Ohio.
Van Camp Sand & Gravel Co., Morrow, Ohio.
Negley Sand Co., Negley, Ohio.
Wapak Sand & Gravel Co., Wapakonetta, Ohio.

OKLAHOMA

Camargo Sand Co., Camargo, Okla.
S. O. Maxey, Durant, Okla.
Midwest Materials Co. El Reno, Okla.
Yabola Sand & Gravel Co., Muskogee, Okla.
Akins Sand & Gravel Co., Oklahoma City, Okla.
Grimmett Construction Co., 525 Cotton Exchange, Oklahoma City, Okla.
Jackson & Squire, Texarkana, Tex & Pryor, Okla.

PENNSYLVANIA

L. B. Smith, Inc., Camp Hill, Pa.
Gildea Co., Hollidaysburg, Pa.
Superior Sand & Supply Co., New Castle, Pa.
Century Silica Co., 4010 Koppers Bldg., Pittsburgh, Pa.
McClain Sand Co., Point Marion, Pa.

SOUTH CAROLINA

Hecker County Sand & Gravel Co., St. Stephens, S. Car.

SOUTH DAKOTA

Consolidated Sand & Stone Co., Sioux Falls, S. Dak.
L. G. Everist, Inc., Sioux Falls, S. Dak.
American Sand & Gravel Co, Watertown, S. Dak.

TENNESSEE

Missouri Portland Cement Co., 1600 Chelsea Ave., Memphis, Tenn.
W. T. Hardison Co., Nashville, Tenn.
Nashville Builders Supply Co., Nashville, Tenn.

TEXAS

Texas Sand & Gravel Co., Ady, Texas.
Panhandle Sand & Gravel Co., Amarillo, Texas.
Western Sand & Gravel Co., Box 1263, Amarillo, Texas.
Western Sand & Gravel Co., Channing, Texas.
Shell Builders, Inc., Houston, Texas.
Fordyce Gravel Co., Box 205, Mission, Texas.
Hillsdale Gravel Co., Sweetwater, Texas.
Texas Sand & Gravel Co., Tascosa, Texas.
Gifford Hill & Co., Inc., Box 1200, Texarkana, Texas.

UTAH

Wheelwright Construction Co., Ogden, Utah.

VIRGINIA

Pounding Mill Quarry Corp., Pounding Mill, Va.

WISCONSIN

Prairie Sand & Gravel Co., Prairie du Chien, Wisc.

CANADA

Cascade Rock & Gravel Co., Vancouver, B.C.

ENGLAND

Sandywood Sand & Gravel Co., Pendlebury, Manchester, England.

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Write for our new Bulletin No. 41

EAGLE IRON WORKS
DES MOINES - IOWA

International Diesel tractor and Adams hauling scraper stripping off a thin layer of overburden overlaying sand and gravel deposit of Lawrence Stone and Gravel Co., at Blenheim, S. C. Excavation is by hydraulic dredge

Stripping, Blasting and Excavating

DRAGLINES, shovels and other established power machines are stripping most of the overburden for the rock products industry, but contractor types of earth-moving equipment are coming into more use each year. Their employment is often justified by the general utility work they do around the plant when they are not busy on earth removal work.

At Hendricks, Fla., in a lime rock plant, for instance, a LeTourneau LS Carryall Scraper is stripping overburden, loading and hauling 11 cu. yd. in one cycle. After uncovering the lime rock, a LeTourneau bulldozer and rooter are connected to the same Caterpillar tractor and two-drum power unit to eliminate blasting the lime rock. The bulldozer windrows the broken limestone for quick shovel pickup.

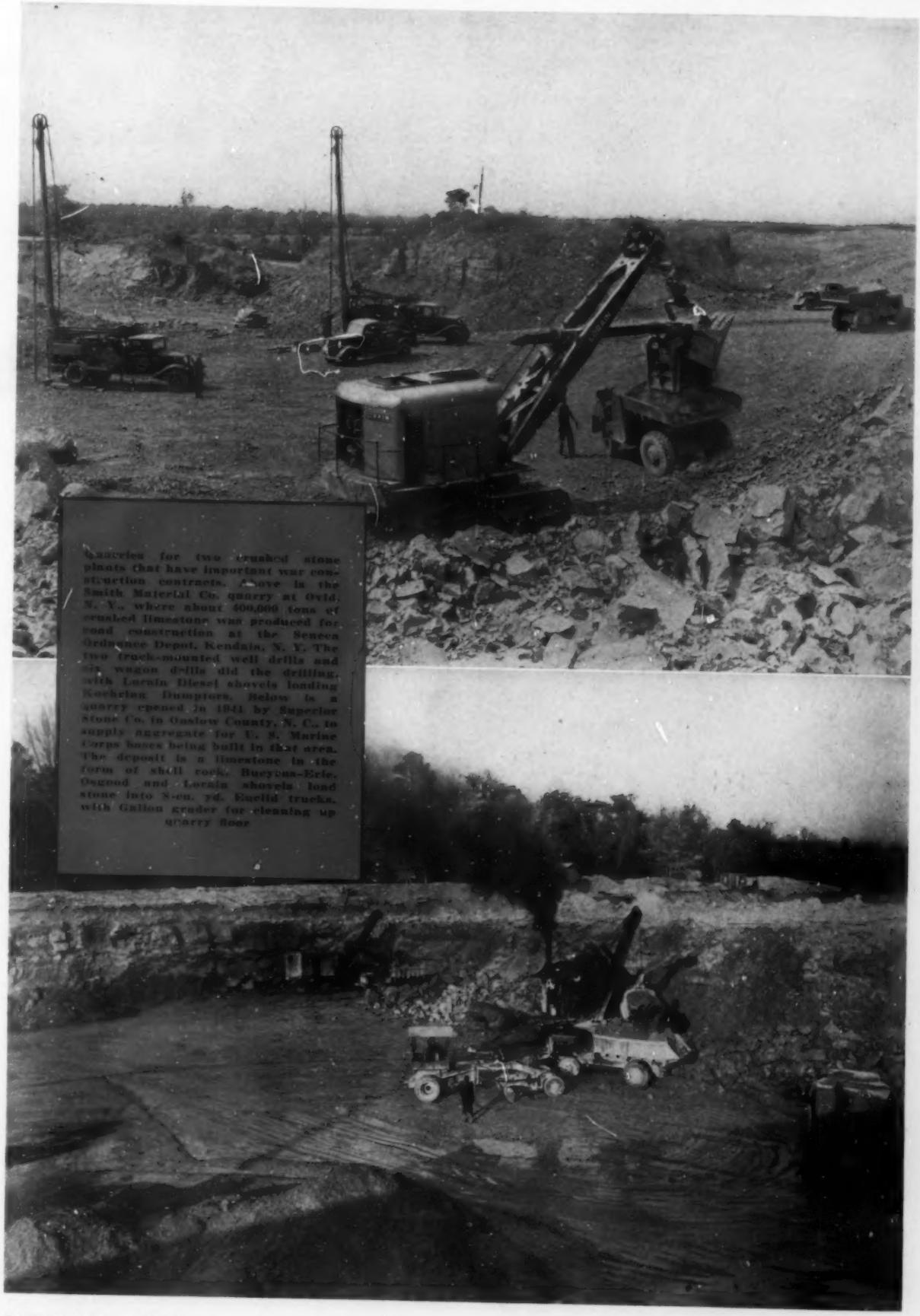
Drilling and Blasting

There does not appear to be a pronounced trend either to very large blast holes or to the smaller diameters driven by wagon drills. Smaller blasts are more common near residential sections, but many of the larger quarries have gone to 9-in. diameter drill holes where heavy tonnages are required. With blast holes that large, faces as high as 120 ft. or more are drilled, with hole spacings of 20 to 30 ft. or more and burdens at least as great. Tonnages as large as 150,000 are not uncommon in a single blast.

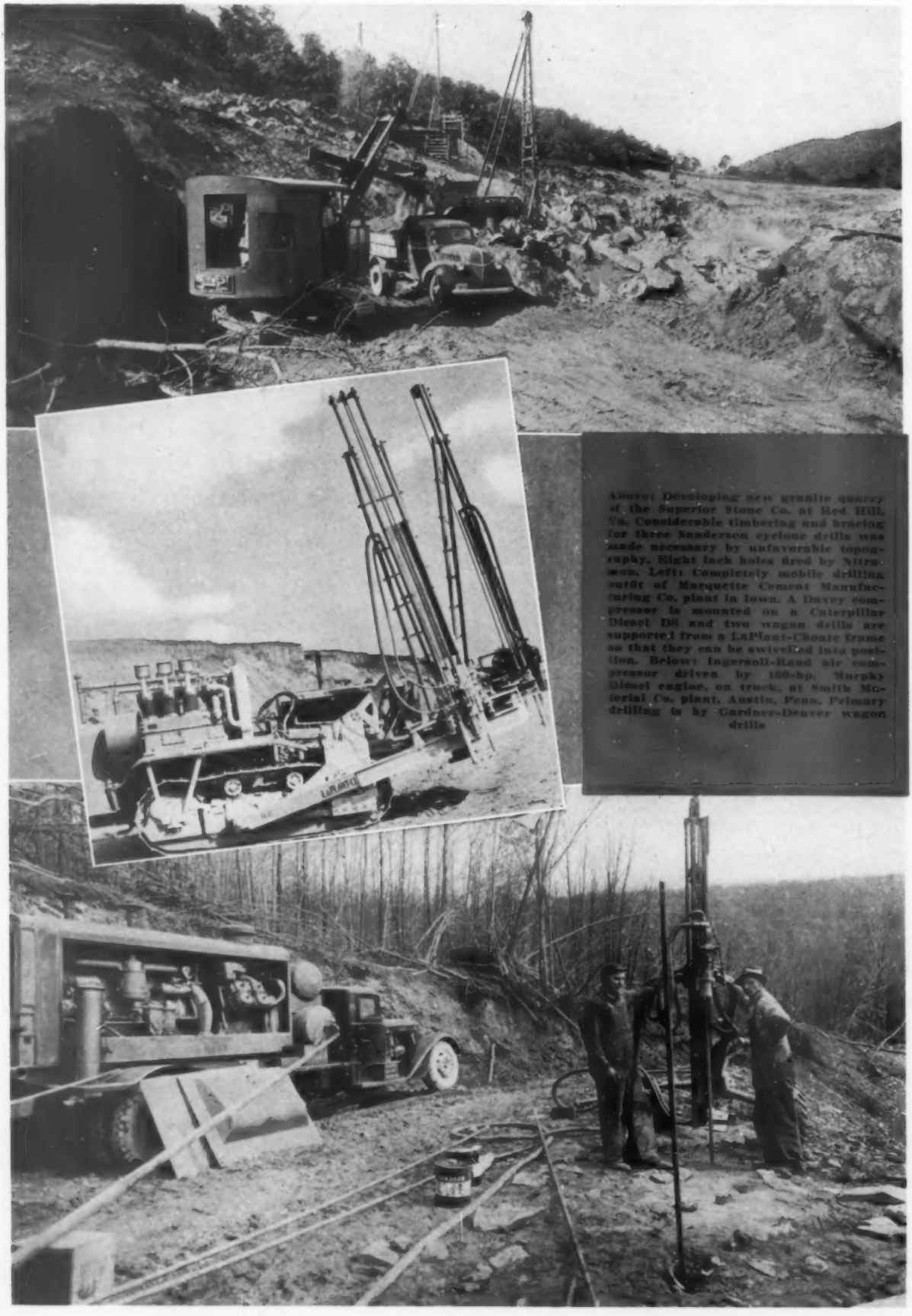
During the year, truck-mounted compressors have been seen in several quarries, for jack-hammer drilling and for wagon drilling. Having the compressed air available at the point of use, reduces line pressure losses and reduces the length of air lines and their maintenance and handling during blasting periods. Usually these compressors are Diesel-driven. Marquette Cement Manufacturing Co., at Des Moines, Iowa, operates a

(Continued on page 102)

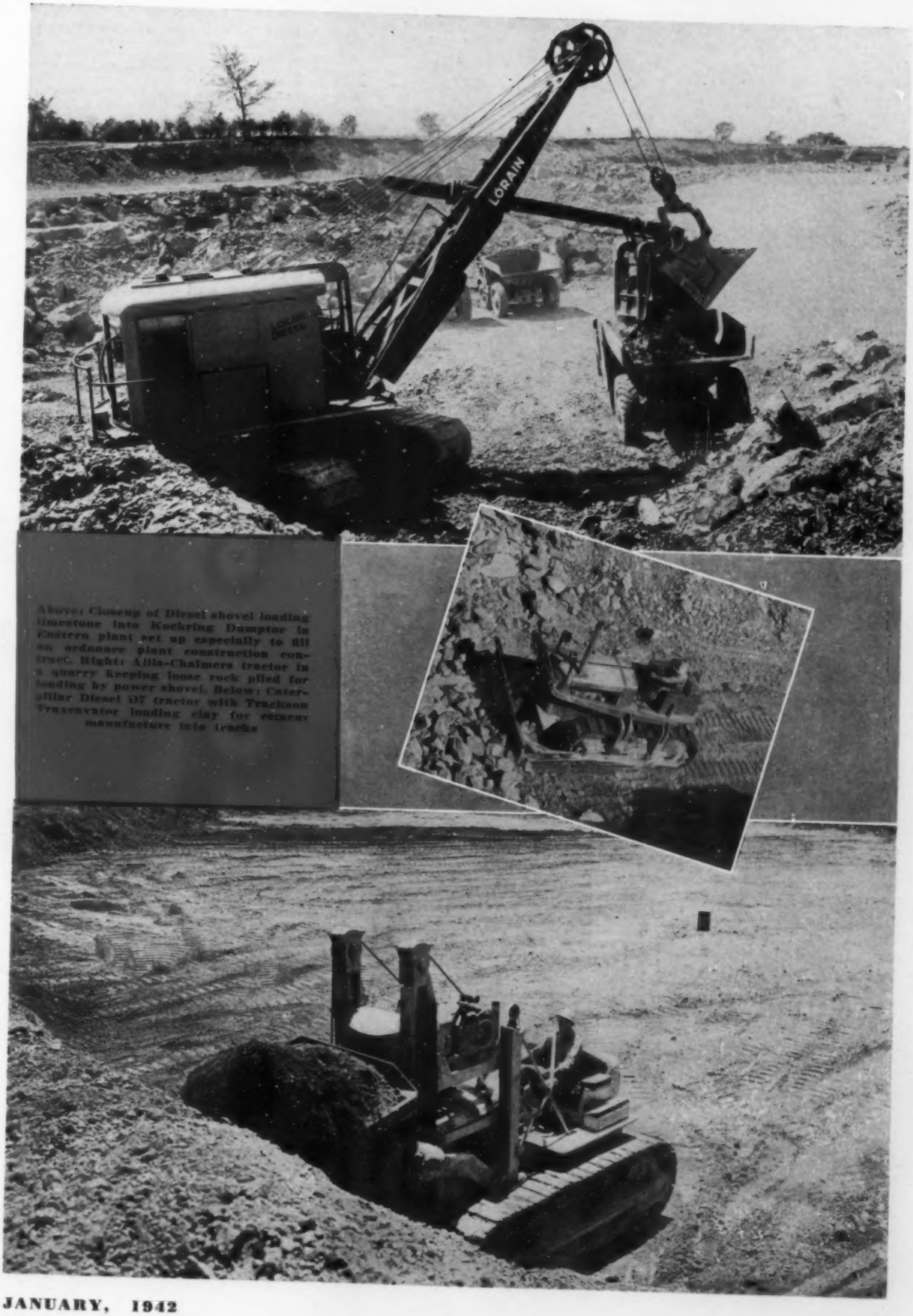
LaPlant-Choate "Carrimor" doing utility work at the Seminole Rock and Sand Co. plant, Miami, Fla. The machine is kept busy most of the time and here is shown hauling material for fill around the plant



Quarries for two crushed stone plants that have important war construction contracts. Above is the Smith Material Co. quarry at Ovid, N. Y., where about 400,000 tons of crushed limestone was produced for road construction at the Seneca Ordnance Depot, Kendaia, N. Y. The two truck-mounted well drills and six wagon drills did the drilling, with Lorain Diesel shovels loading Koehring dumpters. Below is a quarry opened in 1941 by Superior Stone Co. in Onslow County, N. C., to supply aggregate for U. S. Marine Corps bases being built in that area. The deposit is a limestone in the form of shell rock. Bucyrus-Erie, Osgood and Lorain shovels load stone into 8-cu. yd. Euclid trucks, with Gallion grader for cleaning up quarry floor



Above: Developing new granite quarry of the Superior Stone Co. at Red Hill, Va. Considerable timbering and bracing for three Sanderson cyclone drills was made necessary by unfavorable topography. Eight inch holes fired by Nitramon. Left: Completely mobile drilling outfit of Marquette Cement Manufacturing Co. plant in Iowa. A Davey compressor is mounted on a Caterpillar Diesel D8 and two wagon drills are supported from a LaPlant-Choate frame so that they can be swiveled into position. Below: Ingersoll-Rand air compressor driven by 160-hp. Murphy Diesel engine, on truck, at Smith Material Co. plant, Austin, Penn. Primary drilling is by Gardner-Denver wagon drills



Above: Closeup of Diesel shovel loading limestone into Koehring Dumptor in Eastern plant set up especially to fill an ordnance plant construction contract. Right: Allis-Chalmers tractor in a quarry keeping loose rock piled for loading by power shovel. Below: Caterpillar Diesel D7 tractor with Trackson Trenchavator loading clay for cement manufacture into trucks

Left: Compact stone crushing plant of the Smith Material Co. in operation at Austin, Penn., producing crushed sandstone. In the foreground may be seen the scalping screen, jaw crusher and crushing rolls. Truck-loading bins are in the background

Crusher Developments

More exacting specifications and demands for more cubical shaped products affect crushing equipment

THE PROCESS of crushing rock products materials has become more complicated during recent years. Certain requirements have made it mandatory to consider other factors than strictly size reduction. Particle shapes, for either crushed stone or crushed gravel aggregates, are being considered more critically by engineers, a great number of whom want material with cubical shapes. Elongations, flats and slivers are becoming more undesirable to these engineers if present in any appreciable quantity.

Newer type high-speed gyratory crushers that reduce the size of material quickly in stages, impact crushers of several types and the introduction of an additional stage of reduction, using standardized equipment, are the three predominant ways thus far to cube stone or gravel. Many installations of one or the other were made in 1941. Impact crushers are being used more extensively all the time in the elimination of soft particles from gravel or stone. Most of these machines on the market are adjustable so that the softer materials can be made to break down without too much sacrifice of sound material.

Closed Circuits with Screens and Crushers

Impact crushers have been observed in several plants in the manufacture of stone sand or sand from gravel. The sand, so produced, appears to have all the desirable properties of a good sand.

Closed circuits in crushing, with vibrating screens, are in more frequent use. Carrying a circulating load is sometimes beneficial in cubing the material, since a given piece of material is broken maybe twice or even ten times before the screen will allow it to pass. Of course, the crusher need not be set up so tight, when using a closed circuit with a screen, and uneven wear in the crusher is compensated for, since the screen determines the top size of the material.

The Virginia Feldspar Co., Bedford, Va., uses the principle of carrying a large circulating load, for example, in crushing feldspar for the manufacture of glass. The finished product is minus 20-mesh, with a minimum of extreme fines. Reduction to 1¼-in. minus is first made through a Good Roads jaw crusher. Final reduction

New crushing plant of the Edward Balf Co., at Newington, Conn., near Hartford, independent of but adjoining the main stone plant. This is a supplementary plant to produce small sizes of crushed trap rock independent of the main plant production. The primary crusher on the left, a 4-ft. Traylor TY gyratory, is so mounted that quarry trucks dump into it right from the quarry floor level. The second stage of reduction is through a 2-ft. 4-in. Traylor gyratory crusher on upper right. Conveyor on lower right carries the stone to screens over bins. Iowa Manufacturing Co. equipment except for the crushers

Two reduction crushers in the Highland Sand and Gravel Co. plant, near Boston. Small gyratory reduction crusher on right installed to produce 1-in. minus gravel of cubical shape

Right: Floating gravel plant that produces over 100 tons per hour of 100 percent crushed gravel. Primary crusher on left, secondary crusher in center and screening structure on right reaching 55 ft. over the main deck. Large rounded gravel is fed into hopper on left by steam crane

is through a 3-ft. Symons short-head cone crusher, in circuit with a 3- x 10-ft. "Seco" vibrating screen. A Hardinge constant weight feeder regulates the feed into a bucket elevator which puts the feldspar over the screen.

The crusher is set up tight and a circulating load of 1000 percent is maintained, in the production of a granular product. Each piece of feldspar is theoretically subjected to ten fractures.

Impact Crushers

Several noteworthy installations of impact crushers have been made to produce a manufactured sand and to make sand from gravel, in conjunction with hydraulic classifiers.

ber, 1941, pp. 46-48, for a complete description of the plant.

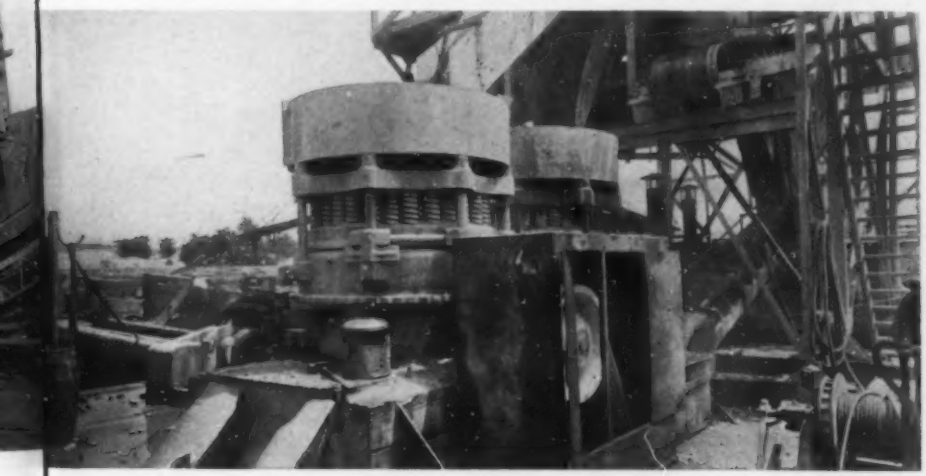
One of the illustrations is of an Allis-Chalmers 322 type R gyratory crusher, operating to produce ¼- to ¾-in. material in the Highland Sand and Gravel Co. plant near Boston, Mass. This crusher is typical of the kinds of reduction crushers coming into wider use and is said to produce a cubical material. Production is 25 tons per hour, all minus 1-in. from a 1½- to 3-in. feed with a power consumption of about 20-hp. The discharge opening on this crusher is adjusted quickly by injecting or releasing oil for a built-in oil-filled hydraulic jack.

Portable Crushing Plants

Portable crushing plants, such as illustrated herewith, are staging a revival in connection with defense construction. Both these plants are owned by the Smith Material Co. of Camp Hill, Penn. They are shown in operation on two major projects. Both are Iowa "Morok" plants, powered by Diesel engines. The company has four such plants.

Two were in operation side by side at Ovid, N. Y., near Geneva, in 1941 to produce about 400,000 tons of crushed limestone from a single quarry for the Seneca Ordnance Depot, Kendaia, N. Y. Delivery of 6000 tons of crushed stone per day had to be guaranteed the contractor, and production reached as high as 8400 tons. Principal plant equipment comprises a 25- x 40-in. jaw crusher, a 4- x 12-ft. double-deck Cedar Rapids Symons scalping screen, a 10- x 36-in. jaw crusher for reduction, 40- x 24-in. rolls and another screen like the first for sizing. Power for each complete

(Continued on page 102)



Two 36-in. Telsmith gyraspheres that are the secondary crushers on a floating plant in the South, producing 100 percent crushed gravel. The primary is a 10-in. Telsmith gyratory

AMERICAN LIMESTONE CO., Knoxville, Tenn., subsidiary of the American Zinc Co. of Tennessee built a large stone sand plant in 1941 to produce all the fine aggregate for construction of the Cherokee dam. The most interesting part of the plant is that crushing rolls were used to produce a product to meet T. V. A. specifications, which are as tough as any.

Dolomitic limestone from No. 4 to 1½-in. top size was the feed to the sand plant. Crushing was done in two stages with two pairs of Allis-Chalmers smooth-faced rolls 24-in. wide. Four 5- x 12-ft. Allis-Chalmers vibrating screens were closed-circuited with the second set of rolls and the crushing was followed by wet classification. See ROCK PRODUCTS, Decem-

Symons impact crusher used in the manufacture of stone sand at a southern dolomite quarry. Feed into it is No. 4 to 1½-in. dry stone. The crusher is in closed-circuit with a vibrating screen. Fines in the final product are regulated by washing and classification

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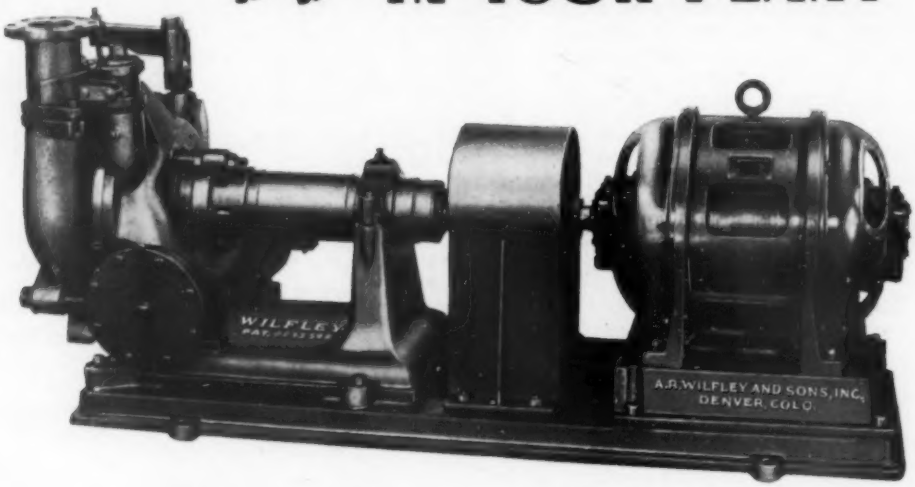

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PATENT CRUSHERS GRINDERS SHREDDERS

Continuous conveyor handling fine dust in a cement mill. The conveyor takes the dust from a central bin and elevates and conveys it to mix with raw material being conveyed by screw conveyor to the kiln feed bins

Speed Up Operations With Conveyors

Cement pumps coming into more general use; continuous flow conveyors have been developed for dry materials; new applications found for pumps

DEVELOPMENTS in the conveying and handling of rock products materials during 1941 were in the introduction of new equipment and in the adaptation of certain equipment to new uses. Cement pumps, for example, are being used more for conveying in closed-circuit grinding in the cement industry. Slurry pumps and sand pumps are proving to be good conveyors for the disposal of waste materials.

Belt conveyors will require more attention from now on, and certain careless and wasteful practices could be eliminated, to materially lengthen the life of rubber belting.

Care of Belts of Vital Importance

Excessive belt speeds result in high maintenance. It is more economical to run a belt fully loaded at a low speed than to run it at a higher speed only partially loaded, particularly in the case of short belts. Cushioning of heavy materials with fines at the point of loading is another worthwhile practice. It is also advisable to clean the belt at head pulleys to prevent pressing material into the belting and to keep the idlers turning. Excessive belt tension, misalignment of idlers, improper pulley sizes, carelessly built skirt boards at loading points, neglect of cuts, grease burns and inadequate protection from unfavorable weather conditions are some of the factors that shorten the life of rubber belting.

Special conveyor idlers have been developed for the purpose of reducing belt wear. Link-Belt Co. has announced a line of troughing-type, rubber-tread impact idler which is designed to absorb the shocks from heavy materials at the loading point. Rubber-tread return idlers of the same make are said to be of advantage in handling wet or sticky materials.

In excavating sand and gravel for the construction of Shasta Dam in northern California, the Columbia Construction Co. developed a special device to prevent damage to conveyor belting caused by iron scrap carried along with the gravel. Damage to belting was sufficient to justify the development, construction and installation of an electrical detector to stop the belt when a piece of scrap passes the detector, and to locate the iron on the belt.

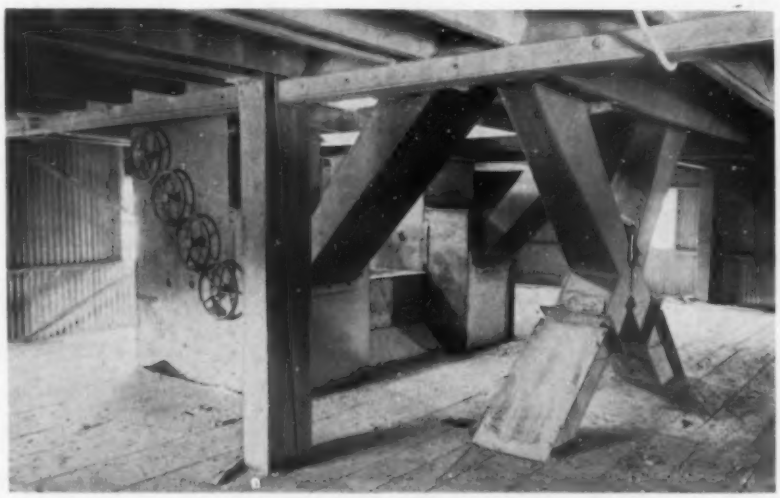
The detector consists of an exploring field coil, excited by voltage through a series of coils and relays, which stops the belt motors when a piece of scrap iron passes it. A chalk marker was developed, to drop a small amount of powdered chalk on the belting, to locate the iron which otherwise would be difficult to find.

A new dewatering belt conveyor, developed by the Fred T. Kern Co., is in operation at the new sand and gravel plant of the Southern Ohio Quarries Co., Chillicothe, Ohio. This conveyor is a short cross conveyor which dewaters sand coming from the drainboard of a drag classifier and transfers it to a long inclined belt conveyor for direct stockpiling in open storage.

Dewatering Belt Conveyor

The conveyor is inclined at about a 10 percent grade, is 15 ft. in length, with 22-in. belting and travels at 25 f.p.m. The sand is confined by 12-in. skirtboards to a 12-in. width, building up a filtering bed for drainage and the water drops over the sides of the belt on to a pan located under the conveyor for its full length. Water so drained off flows by gravity toward the lower end of the pan into a main waste water flume. This conveyor is processing equipment, but used as a conveyor it is a means of handling sand, heavily-laden with water, directly into storage.

Interlocking conveyors and elevators are coming into more widespread use, whereby each piece of conveying equipment has its drive tied in electrically with the other drives in the system. A breakdown or shut off of any unit will automatically stop the others and there is a definite



Well-designed system of chutes in a crushed stone plant for filling either of several bins or for feeding either of several reduction crushers below. Sizing screens are overhead

sequence in the order of starting and stopping the conveyors. Lighted routing boards, sirens and flashing lights are becoming common in some of the larger plants to indicate when bins have been filled, etc., and as warnings to the operator when a change is to be made in the routing of the material being conveyed.

Most of the newer cement plant packhouses, in order to pack out cleaner packages, are using open mesh conveyors to convey sacks of cement from the packing machines to the loading points for cars with dust-collector inlets below the conveyor.

Dewatering conveyor in the sand and gravel plant of Southern Ohio Quarries Co. Incoming sand from sand drag on left is dewatered over the short conveyor, by a filtering process, and made ready for direct stockpiling

Continuous Flow Conveyors

Continuous type conveyors are finding wider application. One of the illustrations shows a Stephens-Adamson Redler conveyor taking cement flue dust from a bin and conveying and elevating it into a screw conveyor, where the dust is intimately mixed with raw material being conveyed to the kiln feed tanks. These conveyors are being used to handle coal from crushing plants into unit coal mill feed bins and for many other uses.

Many of the cement plants with new direct firing unit mills and coal-handling departments are using Fuller pneumatic airveyors for conveying coal into unit mill feed bins.

Link-Belt Co., during the year introduced "Bulk-Flo," a conveyor system for the positive and continuous conveying of flowable granular, crushed, ground or pulverized materials in capacities up to 140 tons per hour. The conveying medium employs a specially-designed chain, to which peak-top flights are attached at every pitch. These divide the material in the conveyor duct into a continuous series of batches which are moved by the peak-top flights. It is said that this elevating and conveying equipment is self-feeding and self-clearing and that horizontal, inclined, vertical or curvilinear paths may be followed.

Pumphouse and slurry tanks at Southwestern Portland Cement Co. plant. Through the lines shown, slurry is circulated between tanks, in blending, by the pumps

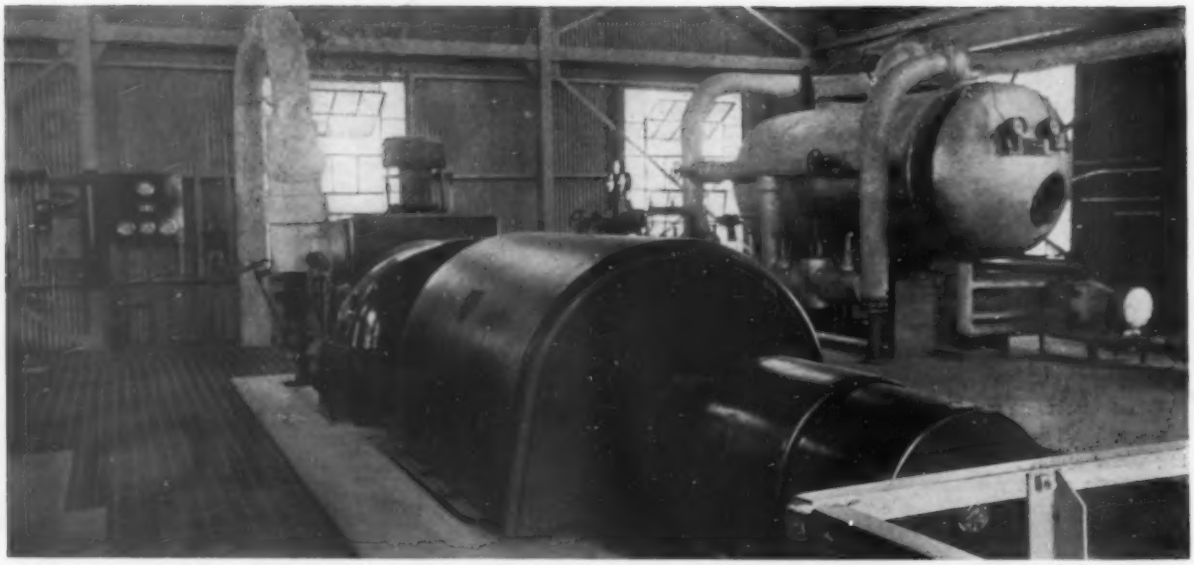
Two slurry pumps in a southern stone plant, for handling fine wet materials in the production of stone sand. These pumps are handling the discharge from a pair of settling tanks back to the feed box over another pair of sand tanks

Pumping Applications

Pumping equipment used as conveyors is also illustrated. At the Southwestern Portland Cement Co. plant, Victorville, Calif., with two new 80-ft. diameter by 20-ft. Dorr slurry tanks, four Morris slurry pumps handle the slurry. Two of them are used for kiln feed, the others for circulating the slurry by pumping from the bottom of the tanks and discharging through pipes at the circumference of each tank.

In classifying manufactured stone sand, the American Limestone Co., Knoxville, Tenn., uses Wilfley slurry pumps for handling between the several stages of settling and classification as illustrated. Sauerman drag buckets and similar equipment continue to have a variety of uses in stockpiling and rehandling materials.

In some plants where the disposal of waste fines is a problem, the waterborne waste from all sources flows to a centralized pump to be pumped to some distant settling pond.



Lehigh Portland Cement Co., at Union Bridge, Md., has a new waste heat boiler plant and power equipment. This turbine-generator set of 3000 kw. driven by steam at 400 p.s.i. at 3600 r.p.m. more than develops the mill power requirements. An average of 11 lb. of steam at the turbine develops one kilowatt of power

Trends In Power Plants

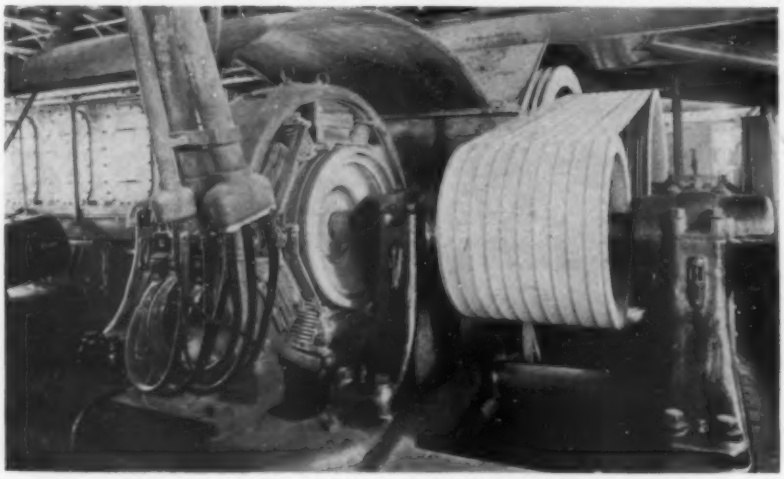
IN THE AGGREGATES INDUSTRIES, the main development in power is the continued wider use of Diesel engines. Most of them are in the 100-hp. to 200-hp. range and a good percentage are V-belted to crushers and other principal equipment or to line shafts, with V-belts from the shafts driving several pieces of equipment. A typical average plant would have anywhere from two to six engines.

Most of the installations in 1941 were made either in preference to purchased power on the basis of cost or because of the inaccessibility of the plant to existing power lines. Under today's operating conditions the availability of purchased electrical power is to be considered. Independent power plants have an added advantage under conditions such as the shortages of hydro-electric power that

Above: Crushed stone plant of Churchill Gravel Co., near Chenon, Ill., powered by three permanently-mounted 165-hp. Cummins Diesel engines. Two engines drive jaw and roll crushers by flat belt, the third a hammermill

Below: Drive consisting of a Jones speed reducer and Reliance motor on the first belt section of a gypsum board machine, showing vari-pitch pulley control for initial synchronization of speeds of the various belt sections

Below: Typical of a modern drive is this Gates Vulco V-belt to drive a 250-kw electric generator from a 500-hp. Worthington Diesel engine on the dredge "Magic City" of the United States Dredging Corp., New York, N. Y.



Interior of new power house of Lehigh Portland Cement Co. at Union Bridge, Md., showing electrical control equipment and, on the left, the turbine-generator set

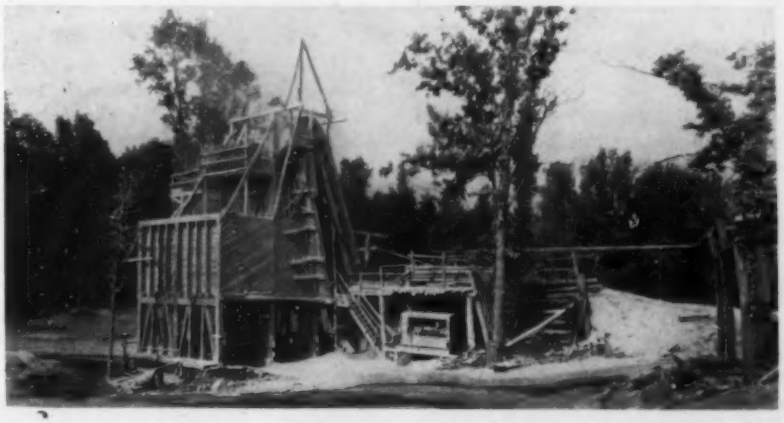
existed throughout the Southeast in 1941.

The plant of R. F. Hedrick, Siler City, N. C., shown herewith, is typical of numerous small Diesel-equipped plants in the Southeast. Production is 300 tons a day of crushed granite, and by V-belt and line-shafting a single 125-hp., 6-cylinder Caterpillar Diesel engine drives all the equipment. The engine and another just like it driving an air compressor each consume 35 to 40 gal. of fuel oil in 10 hr.

Union Sand and Gravel Co., Morganfield, Ky., drives an 8-in. gravel pump by a Cummins Model HP601 Diesel engine at a cost of 1/3c per ton for power. The pump handles 125 tons of solids per hour against a 50-ft. head.

Power plant Diesels run larger, up to 500 or 600 hp. for large stone plants and lime plants. San Antonio Portland Cement Co., San Antonio, Texas, has 8200-hp. in power plant Diesel engines, as large as 1500-hp. in a single unit.

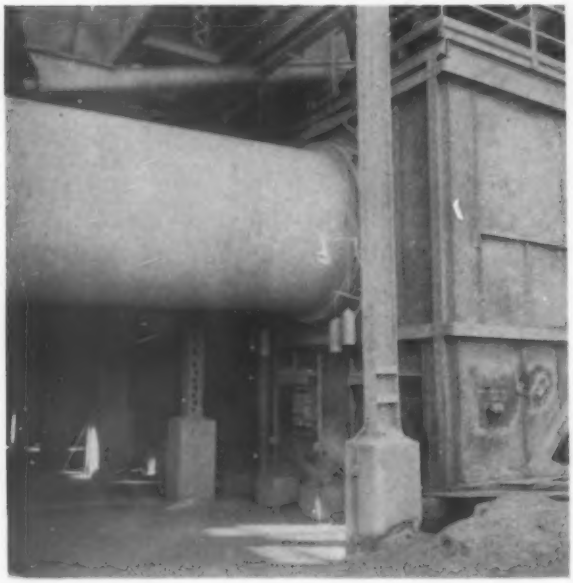
Several new waste heat boiler installations have been made in the portland cement industry recently, but, on the other hand, it begins to appear that some cement plants with old waste heat boilers will have to purchase power. Economies in kiln firing do not leave so much heat for steam generation.



Above: Typical small crushed stone operation in the Southeast. The Diesel engine shown drives, through V-belt and shafting, two crushers, a bucket elevator and vibrating screen to produce 300 tons in 10 hr.

Below: Trailer-mounted power plant of Smith Material Co. in operation at crushed stone plant near Austin, Penn. Two 200-hp. Murphy Diesel engines each drive a 125 k.w. Ideal electric generator to develop power for all the drives

Below: One of five Cummins Diesel engines in the M. A. Gammino Construction Co. crushed stone plant near Providence, R. I. This one is V-belted to a jaw crusher



Feed arrangement for dry process cement rotary kiln, consisting of inclined screw conveyor with surge hoppers over it to compensate for variations in feed material

Controlled Feeding Improves The Products

Proper rate of feed into crushers, classifiers conveyors, and sereens increases plant efficieney

REGULATION of the feed of materials into processing and handling equipment is becoming more in evidence. It is recognized that the proper rate of feed into crushers, classifiers and on to vibrating screens and other equipment is essential to efficient performance of these processing machines. Furthermore, feed regulation into conveying equipment is essential in keeping a plant uniformly loaded and more efficient in all-around operation.

Electric vibrating feeders of the kinds illustrated, for example, are becoming common for feeding materials out of bins on to belt conveyors, with good results. The problem of feeding finely ground materials from bins becomes complicating and involves getting the material to the right kind of feeder.

Feeding fine material uniformly into kilns, or into grinding mills, is a problem that has not been solved in many plants, because the tendency of this material is to hang up in bins or hoppers and to flood out in a surge.

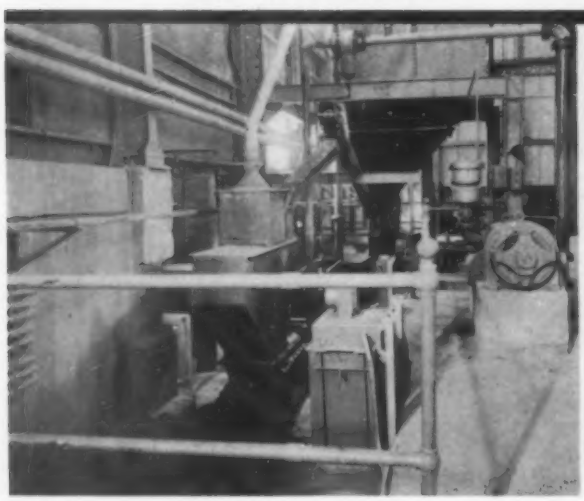
Controlling Kiln Feed

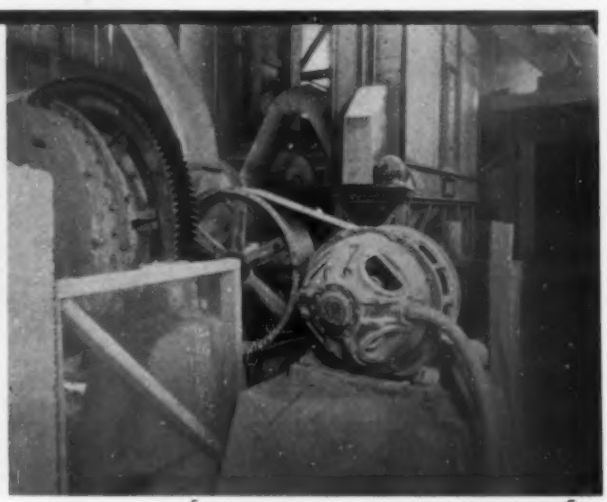
According to an engineer of a large portland cement company, variations in the rate of feed into kilns occur often during a day's run of clinker although checks on production over a day might show uniformity. These variations showed up when checking production for a series of short intervals of time during a day although, accumulatively, output remained fairly constant. Variations in feed, of course, have their effect on the degree of calcination to which the material is subjected.

One of the illustrations shows the arrangement developed by the Pennsylvania-Dixie Cement Corp. for feeding kilns at one of its plants. Inclined screw conveyors, a common type of feeder for the purpose, are used. On this kiln there are two 9-in. screw conveyors under each feed bin that convey the material up a 15 deg. incline to discharge into the kiln feed pipe. The drive is a 10-hp. d.-c. gearmotor. Small open top surge hoppers have been built over each screw conveyor, the idea being that excesses coming to the screw conveyors resulting from surges of material from the feed bin will build up inside the surge hoppers and then feed out of the hoppers by gravity back into the screw conveyors when the condition clears itself. It is intended as a regulator

Left: Showing an arrangement for blending flue dust with fresh raw material feed, that is typical of the system used in some dry process cement plants. Inclined screw conveyor feeds the dust from the bin into the stream of raw material at the Fuller-Kinyon cement pump

Right: Grinding mill at the New Enterprise Lime and Stone Co. plant for grinding agricultural limestone. This Hardinge mill has the rate of feed into it from an overhead bin automatically regulated by a Hardinge electric ear





to smoothen out the flow through the feeder.

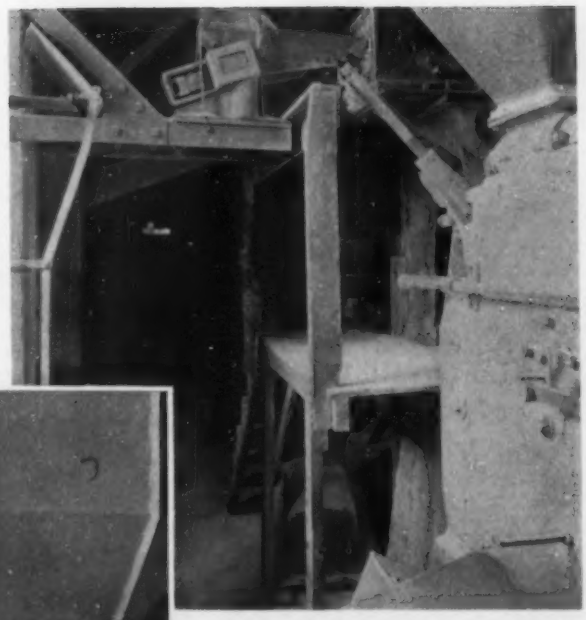
Continuous bucket elevators emptying into small, open-top kiln feed hoppers where the fine material has no opportunity to pack are another means of solving the difficulty, as well as for feeding grinding mills. In the newer cement mill packing plants and in some ready-mixed concrete plants, bulk material bins are never allowed to fill up for this same reason, unless in case of emergency. They serve only as reserve storage.

Vibrating Type Feeders and "Sound" Control

Electric vibrators, such as those manufactured by the Syntron Co., attached to the hoppered sides of bins are being used more extensively to keep material flowing, and air lines into the bins are another means. In some instances, the tapering bottoms of bins are widened out to prevent packing.

Other devices for feed regulation, into grinding mills, are the Hardinge electric ear and the Kennedy automatic mill level control. The electric ear is a device for automatically slowing or speeding up rate of feed according to the sound within the mill, which is a measure of too little or too much material inside the mill.

The other method is based on the variation of the dielectric media (air and coal dust in a tube mill grinding coal) between the two plates of a condenser. The condenser consists of a rod extending into the mill and the mill itself. Variation of the dielectric media causes a variation of high frequency current which is utilized to automatically change the speed of the mill feeder motor.



Below: Constant weight feeder to regulate circulating loads as high as 1000 percent in grinding feldspar at Virginia Feldspar Co., Bedford, Va. Feed is into a bucket elevator which puts stone over a vibrating screen in closed circuit with a cone crusher

Above: Another electro-magnetic vibrating feeder, this one feeding silica into a ball mill for grinding into silica flour. Electric ear automatically regulates operation of the feeder

Another illustration is of an arrangement for feeding sand and gravel containing clay from a plant receiving hopper on to a belt conveyor feeding the main plant. Because of the nature of the material, a 9 ft. by 42-in. Link-Belt reciprocating feeder was set perpendicular to the primary belt, to parallel the hopper above and allow the use of a hopper with steep sides. The feeder dips downward 1-in. to the foot to discharge its contents on to the belt conveyor.

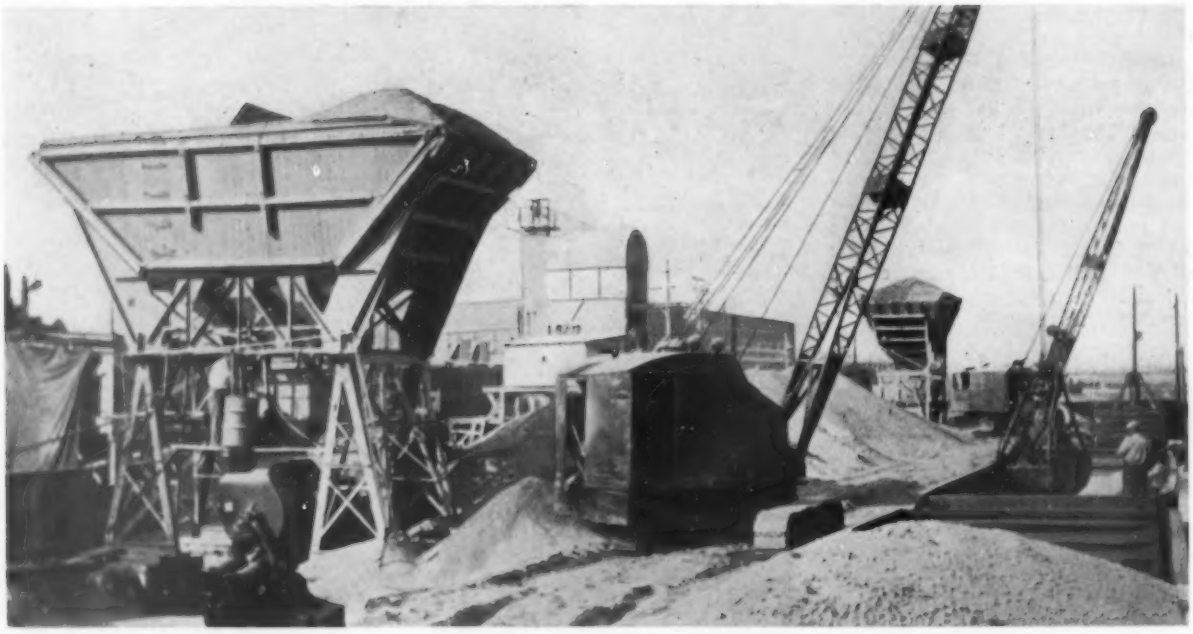
Typical installation of the Jeffrey-Traylor electro-magnetic type of feeder, this one regulating the feed of limestone from a surge bin to a belt conveyor

Sleeve Bearings Handbook

OVER 200 PAGES of information on sleeve bearings and bushings, the different metals, and the design and application of bearings has been compiled by Albert B. Willi, chief engineer of the Federal-Mogul Corporation, Detroit, Mich. This unusual handbook has been published and is now being distributed through the Federal-Mogul Corporation as a practical guide for the engineer, designer and draftsman. The handbook is arranged in 11 sections devoted to bearing materials, precision insert split bearings, oil grooving, shims for adjustment of bearing clearance, definitions, identification tests for various types of bearings, calculation of viscosity, and dimension data sheets.

A.S.T.M. Standards for Panama Cement

SPECIFICATIONS issued by the authorities responsible for the work at the Panama Canal have incorporated the requirement that cement should be Type IV of the A.S.T.M. Tentative Specifications C150-40T. Type IV is used when a low heat of hydration is required. About 6,000,000 bbl. of cement are involved.



Batching plant used by the Fred Schmitt Material Co., to supply aggregates for thirty 1½ cu. yd. truck mixers which have hauled 300,000 cu. yd. of concrete for St. Louis ordnance plant

War Demands For Ready Mix

Over 12 million cubic yards of ready mixed concrete produced in 1941

DEFENSE PREPARATIONS and present war demands are taxing the production facilities of ready mixed concrete plants throughout the country. Housing projects also are taking large tonnages of ready mixed concrete. It is anticipated that this demand will continue to absorb the capacity of the industry during 1942 in all areas where there are war construction activities. There may be some decreases in areas not affected by the war program of the government, but it is believed that plans to shift aircraft and ordnance plants to interior centers will create new demands for ready mixed concrete in localities which heretofore have not felt the impact of war construction projects.

Little accurate information is available as to the production of ready mixed concrete, but the National Ready Mixed Concrete Association has compiled some approximate fig-

Cheyenne plant of Ready Mixed Concrete Co., Denver, Colo., comprises a 51-ton, two-compartment bin with third compartment added to the original installation, and a 300-bbl. bulk cement bin

ures which show the amazing growth of the industry. In 1925 there were only about 25 plants and in 1929 probably fewer than 100. In 1937, the association listed 572 producers, and in 1941 the list had grown to 702. While this list is not complete, it omits very few, if any, of what may be termed established producers.

In 1939, production was about 1,500,000 cu. yd. During 1930 and 1931 there was a rapid increase in number of producers with the volume reaching 5,000,000 cu. yd. More reliable figures for the years 1933 to 1936 show a production of 2,600,000 for 1933; 3,200,000 for 1934; 3,500,000 for 1935; and 4,700,000 for 1936. There was another rapid gain in 1935 and 1936, and in 1937, 230 of the 572 producers had a volume over 6,000,000 cu. yd. It has been estimated that with the other 60 percent of the producers, the volume for 1937 was about 10,000,000 cu. yd. The figure for 1939 was approximately the same as for 1937, and it is believed that about 11,000,000 cu. yd. was produced in 1940, and nearly 12,650,000 cu. yd. for 1941. These estimates include only the established commercial ready mixed concrete industry and no attempt has been made to estimate the yardage of concrete handled by contractors in truck mixers.

Defense Contracts

For example, the U. S. Transit-Mix Concrete Corp., New York, N. Y., was formed as an affiliate of the McCormack Transit Mix Concrete Co., to operate outside the metropolitan New York area on large projects. This company pioneered the idea of mov-

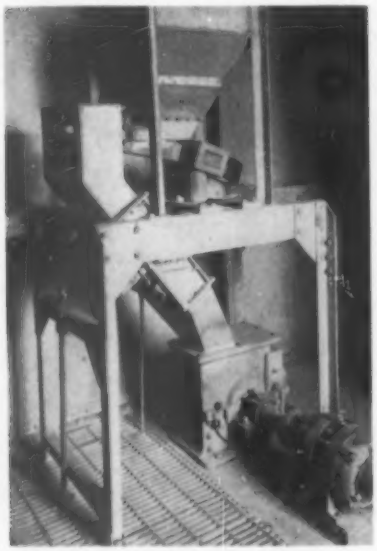
(Continued on page 156)

Above, top view: Central batching plant (Blaw-Knox) for Cornell-Young Co., on Santee-Cooper project to furnish concrete for slope paving with "porous" concrete.

Bottom view: Central Concrete Co. uses a 5½-cu. yd. Rex truck mixer for deliveries to large ordnance project

Below: Pouring 25-ft. runways for a bomber air field in California, using 4-cu. yd. Jaeger high dump mixer trucks

Miniature motor-driven ball mills used in the preparation of samples for test



Riffler and can used to catch sample of clay at top of bucket elevator

Hopper and small vibrating feeder over hammer mill to reduce material sampled, catching test sample in receptacle

Blend Raw Materials

(Continued from page 49)

bucket elevator into a 75-ton bin over its scale, and a pan conveyor and bucket elevator handles each of the other admixture materials separately into their respective bins. Limestone is dried and crushed through two 48-in. Allis-Chalmers "pulverators," before it is transferred to its scale bin.

Each batch is based on 1500-bbl. of limestone along with the required amounts of the other materials. Each scale bin draws from a given release bin until it is empty before any other material is handled. Should any of the five scale bins become empty, the scale will tilt and stop all of them.

All the materials are blended thoroughly enroute to the raw mill. A 15-in. double-deck drag conveyor and a bucket elevator followed by another drag conveyor fills a bin from which a 3-compartment Allis-Chalmers Compeb mill gets its feed. Ground raw material is conveyed to a 10-in. Fuller-Kinyon pump which pumps it into three silos of 8000-bbl. total capacity.

Samples are taken continuously in withdrawing the contents of the silos for kiln feed, with hourly analyses taken of the final kiln feed material. This material is withdrawn at four points from each silo.

Dust Collecting System

A complete system of dust collectors is in operation in the proportioning department. Both the stone and clay dryers are connected to the Cottrell precipitator. An 8-cell Norblo automatic bag collector handles the dust from the clay handling system, discharging the dust into the clay elevator. A similar one, of four cells, at the discharge end of the admixture dryer discharges its dust into the dry pan. A Western Precipitation Multiclone with Norblo fan is connected to the feed end of this dryer and the dust is conveyed by a drag conveyor into the elevator handling dried materials from the dryer.

Crushing Developments

(Continued from page 91)

plant is developed by two balanced units, each comprising a 200-hp. Murphy Diesel engine and a 125 k.w. Ideal alternating current generator. Individual motors drive the equipment. The other plant illustrated was at Austin, Penn., producing crushed sandstone for a highway contract.

California Sand and Gravel Co., near Oakland, Calif., is operating a 250 ton per hour plant where sharp sand is hard to get. Using a 30-in. Symons impact crusher, pea gravel is crushed down into sand at the rate of 25 to 30 tons per hour, the crusher being closed-circuited with a vibrating screen. Pea gravel happens to be plentiful. The manufactured sand is said to meet government specifications and to be very much in demand. The crusher has a 550-hp. motor drive and turns at 1625 r.p.m.

Excavating

(Continued from page 86)

complete, self-contained portable drilling unit. It is tractor-mounted, powered by a Diesel engine and carries two air compressors and two 4-ft. derrick drills. The compressors have a reserve capacity for secondary drilling.

Probably the newest development in excavation has been in the supplemental use of auxiliary shovel equipment in some quarries to speed up operations. Louisville Cement Co. follows up a 4-cu. yd. Bucyrus electric shovel by a Traxcavator on a Caterpillar Diesel D-4 tractor. The ¾-cu. yd. bucket cleans up all the smaller rock which may be left by the big shovel and dumps direct into the quarry cars.

New Use for Lime

(Continued from page 44)

amount to carry fresh solution in manageable form. Actually it is a slurry of finished magnesium chloride with strong solution from the previous filtering step.

The product of the shelf dryers is in solid crystalline form. This is fed to the electrolytic cells where dehydration is completed. The cells consist of cast steel tanks, serving as cathodes, in which are suspended graphite anodes. Each cell is placed over a gas-fired furnace to keep the bath molten. As the electrolysis proceeds at about 6 volts, metallic magnesium is released in molten form, 1 lb. for each 9 kw.h. of power consumed. Being lighter than the bath mix, the metal floats on top and is removed by skimming and poured into ingot molds to form 17-lb. pigs (24- x 4- x 4-in.). Simultaneously, chlorine is liberated by the electrolysis. Since the cells are open to allow metal to be removed, the chlorine is taken up by a current of air and blown to the hydrochloric acid plant. The chlorine meets a stream of natural gas with which it unites to form hydrochloric acid and carbon monoxide. The acid is absorbed in water to form the neutralizing acid to convert magnesium hydroxide to magnesium chloride. The chlorine from the magnesium cells is supplemented by additions of chlorine from the caustic soda cells in a neighboring unit.

Separation Processes

(Continued from page 84)

each of the fans. Production is 24 tons a day.

One of the illustrations is of Deister Machine Co. concentrating tables used by The Central Silica Co., Glass Rock, Ohio, in removing iron from sands for high grade glass making. The iron content must be reduced to less than .015 percent from a starting figure of .05 percent. Iron occurs as a surface coating, or in granular form but not within the grains of silica. After scrubbing, washing and tabling the sand is put through an acid leach plant where the Fe_2O_3 is reduced to .01 percent.

In screening, horizontal screens continue to increase in numbers particularly where low head-room is a factor in fitting new screens into existing structures.

Closed-circuit wet grinding of cement raw materials, using electrically vibrated screens to make the separation, is increasing. Wire cloth as fine as 60-mesh has been found practicable in these circuits. Universal Vibrating Screen Co. has recently placed on the market a screen called the "Univibe" vibratory riddle that is said to be able to dry screen materials down to minus 200-mesh. It is a small machine and is being used for screening foundry sand and for very accurate sizing of small amounts of other materials.

Calcination

(Continued from page 57)

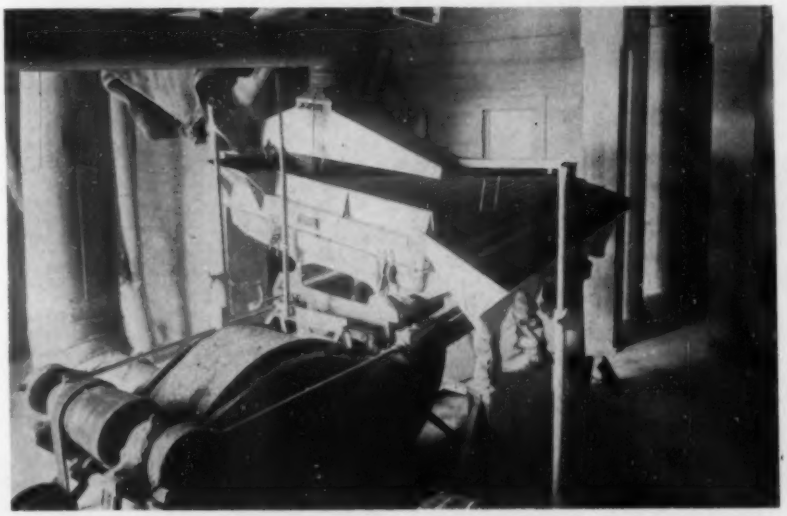
burn limestone from ¼-in. up to about 2 in. (ROCK PRODUCTS, December, 1941, pp. 53-55). It is claimed that this kiln has the simplicity of operation of a rotary kiln and the heat efficiency of the shaft kiln.

The unit is automatic and continuous in operation; is designed for an efficient heat balance; variable temperature of the combustion gases; and is very small.

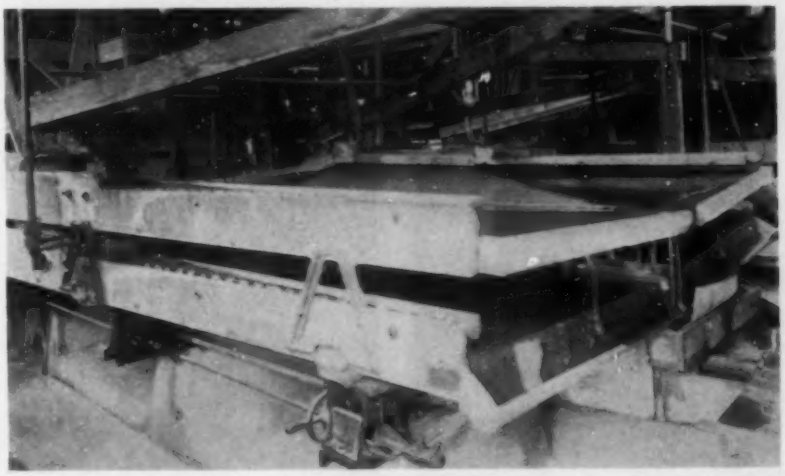
Production is 2000 lb. of lime per sq. ft. of inside area per day in a unit 14 ft. high by 7-ft. x 4 ft. 6 in. Exhaust gases measure 520 deg. F., and the lime discharges at 135 deg. with a feed of 3/16- to ⅝-in. stone. Flow of material through the unit is regulated, by a new type of discharge mechanism, in order that all the material be given the same uniform treatment.

A midwestern cement plant is the first to install a fluid coupling, manufactured by the American Blower Corp., to drive a kiln fan. It provides switchboard control for the speed of the draft fan, which has importance in maintaining constant combustion conditions in a rotary kiln.

Simple arrangement at the Blue Ridge Stone Co. plant, Blue Ridge, Va., to dewater stone sand with a screw conveyor for direct placement into stockpile by belt conveyor



Air table in Victor Mica Co. plant to make a separation of mica from sands. Mica tends to float as air is blown uniformly through the table by the fan on left



Battery of concentrating tables in silica plant to separate out iron that has been loosened and dislodged through washing and scrubbing. After tabling, the sand is acid leached

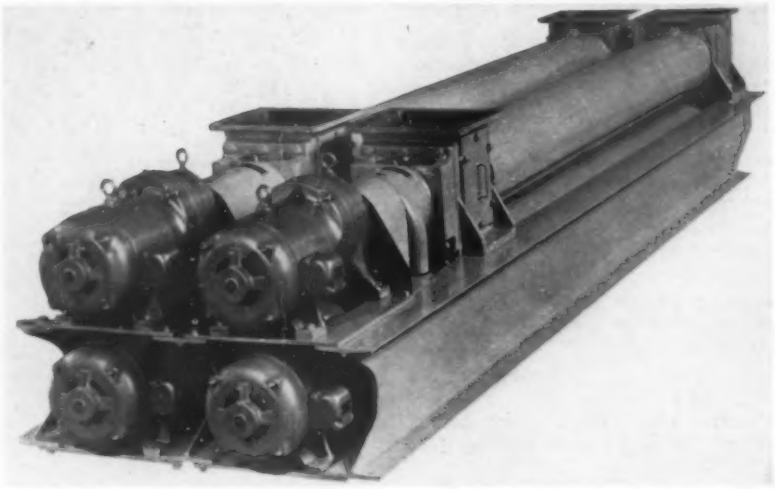
MANUFACTURERS' Ideas

Cement Plant Equipment

● RADIATION TYPE PYROMETERS are coming into more general use in the calcination processes involving manufacture of cement and lime. The Brown Instrument Co. brought out during the past year what has been termed a Radiamatic pyrometer. In operation, the detector of the pyrometer is focused through a hole in the firing hood upon the kiln lining in the hot zone, and a continuous record of kiln temperatures is recorded on a Brown recording potentiometer on the control

panel. Kiln speeds and the rate of feed of raw material into the kiln are held constant. Burning conditions inside the kilns are stabilized constantly by adjustment of coal feed only. The Radiamatic pyrometer consists essentially of a heat-resisting lens, a compensator and a thermopile.

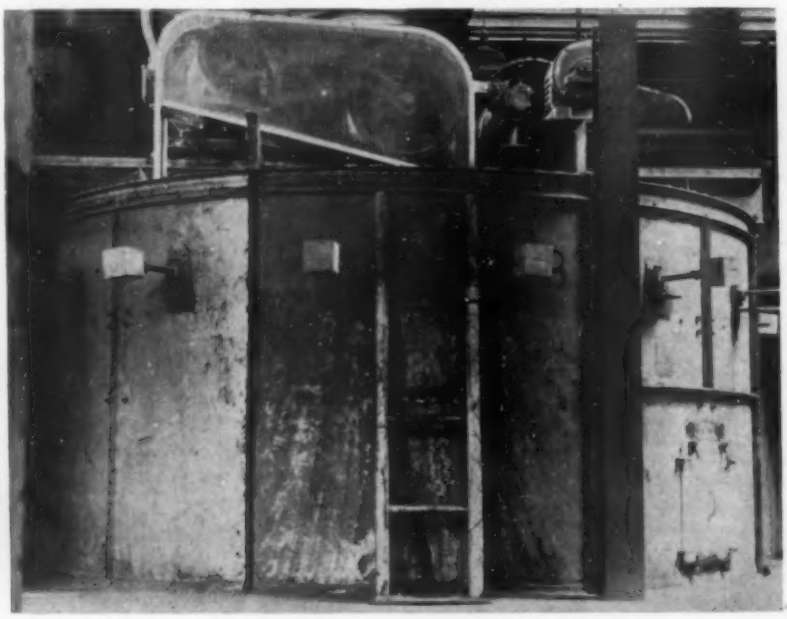
● BELOW: CENTRALIZED LUBRICATION for large machinery has been adopted by a number of companies. Trabon Engineering Corporation has developed a non-reversing, single pipe system which provides forced feed centralized lubrication. This unit has a single inlet, multi-outlet distributor feeder and the series "MP" variable feed, multi-outlet pump. This improved feeder consists of a bank of three or more sections, each of which discharges a known and measured quantity of lubricant alternately through one or two discharge outlets which are direct connected to bearings. The capacity or volume of the different sections of the same distributor may vary from 0.005 cu. in. to 0.035 cu. in. A single distributor delivers just the desired amount of lubricant to all connected bearings.



● CEMENT IS BEING SHIPPED OUT so rapidly after manufacture that in a good many cases it has been necessary to provide some method of cooling. The Fuller Co. brought out a new cooler last year which has been designed especially to cool freshly ground cement to satisfactory shipping temperatures. These coolers comprise assemblies of parallel units to meet any capacity requirement, each unit having a capacity of 50 bbl. of cement an hour.

Temperature drops ranging from 100 deg. to 150 deg. F., depending upon initial cement temperatures are reported from coolers in commercial service. The cooling water supply, at normal temperatures, averages 2800 gal. per 100 bbl. Power consumed in driving the coolers ranges between 8 and 9 hp. per 100 bbl. The vertical height of the cooler assembly has been kept low to adapt it for installation between mill spouts and pump hoppers or collector screws and other locations where headroom is limited. Each unit comprises a pair of water-jacketed casings, each casing surrounding a cooling tube of wide diameter through which the cooling water also circulates. The space between the tube and jacket is narrow to expose the cement to a large area of cooling surfaces. Each cooling tube is directly driven by a separate motor with built-in speed reducer. Narrow screw flights on the cooling tube advance the cement. The cooler units are assembled in parallel with their inlet and discharge flanges at the same level for capacities above 50 bbl. an hour.

● BELOW: AT A LARGE CEMENT plant there are four Sturtevant air separators from which project a number of small dimension steel rods for adjusting the vanes on the inner surfaces of the machines. The B. F. Goodrich Co. furnished pads of its air-cell later foam material to encase the ends of the rods to prevent any possibility of injury.

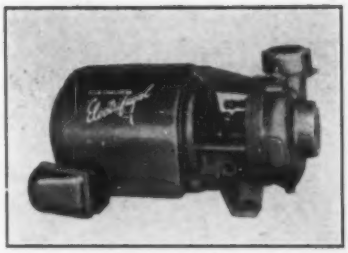


MANUFACTURERS' Ideas

● A MOTOR-OPERATED REGULATING gate is now part of the Poidometer equipment made by the Schaffer Poidometer Co. This patented feature has been recommended by the manufacturer for material such as stone and clinker that contains cubes of various sizes. The weighing roller, located in the center of the scale platform, is connected by means of the weighing beam and control rod to a control box. Limit switches in the control box are electrically connected to a reversing switch of the motor, which is coupled to a worm gear unit. The output shaft of the worm gear unit is connected to a regulating screw which operates through a regulating rod. The safety limit

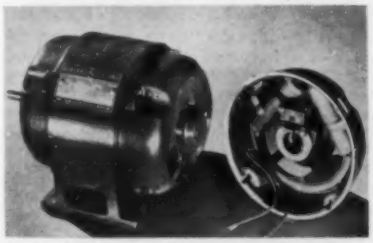
switches are placed at the extreme upper and lower limits of the regulating gate travel.

Drop weights are placed in position and the slide weight is moved to the proper setting on the scale beam to give the desired amount of material per foot of belt. The Poidometer is then put in operation by pressing a push button. If the weight of the material on the scale platform is greater than the weight on the scale beam, the weighing roller is depressed and the control rod makes contact with the limit switch which immediately starts the motor that lowers the regulating gate. This gate continues to lower until the weight of the material on the scale platform balances the weight on the scale beam. When the weight of the material on the scale platform is lighter than on the scale beam, the weighing roller is elevated, making contact with the limit switch.

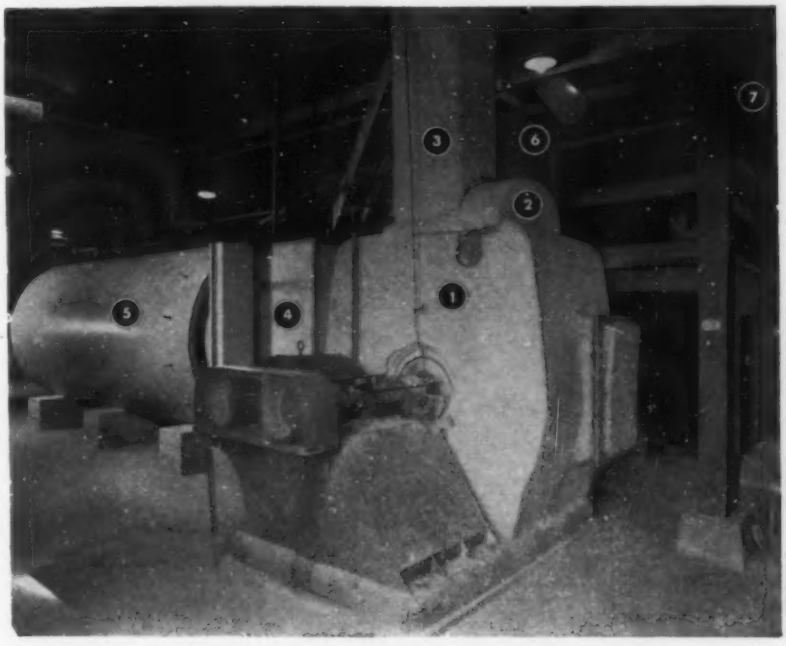


● A COMBINED PUMP AND MOTOR unit has been placed on the market by Allis-Chalmers Manufacturing Co., known as the "Electrifugal" pump. It is a centrifugal pump designed as a complete pump and motor unit on one shaft and one housing. It has a special motor with a one-piece cast iron motor yoke and pump bracket. The feet are cast integral with the housing and bracket and extend under the entire unit instead of under the motor only. The special motor design meets NEMA specifications for splash-proof motors. Totally enclosed, fan-cooled motors and explosion-proof motors are also available in this unit. This is now obtainable in sizes from 1-hp. to 10-hp. inclusive at 3500 r.p.m. and from ¾-hp. to 7½-hp., inclusive at 1750 r.p.m. for heads up to 160-ft.

● BELOW: DISPERSION DRYING OF materials is becoming more general practice, and Western Precipitation Corporation has designed equipment which is said to be particularly effective for application in the rock products industries. The unit illustrated is known as the Turbulaire dispersion dryer. Capacities of the various units manufactured range from 75 lb. to as high as 4000 lb. water evaporation per hour. This system is being used for drying pumicite and to handle metallurgical slime that is colloidal and unfilterable. In dispersion drying, the wet material is fed continuously to a pug mill mixer. It is mixed with damp material returned from the Impax separator which is part of the collecting system, and in some cases with a portion of the finished producted collected in the Multiclone. The wet semi-solid material is internally circulated by mechanical means with the heated drying medium in the Turbulaire dryer where the drying takes place in agitated suspension. Partly dried oversize particles thrown down in the Impax separator are returned to the pug mill to be mixed with fresh raw material and recirculated in the cycle. The fine, dry finished product passes through the Impax separator and is collected in the Multiclone. The drying medium may be the products of combustion with either a gas, oil or coal-fired furnace, diluted with fresh air or air recirculated from the dryer vent to the desired inlet temperature of from 200 to 1200 deg. F.



● ABOVE: A NEW TRI-CLAD CAPACITOR motor was introduced by General Electric Co. during the past year which was designed to meet a large number of varied industrial applications. Like the polyphase motor of this type, the capacitor motor features modern appearance, and better mechanical and electrical protection as well as protection against operating wear and tear. The new capacitor motor may be obtained with either ball-bearing or sleeve-bearing construction, and is available in two types, type KC and type KCJ. The type KC is designed particularly for applications requiring moderate starting torques such as fans, blowers, and centrifugal pumps. The type KCJ is designed for compressors, loaded conveyors, and reciprocating pumps.

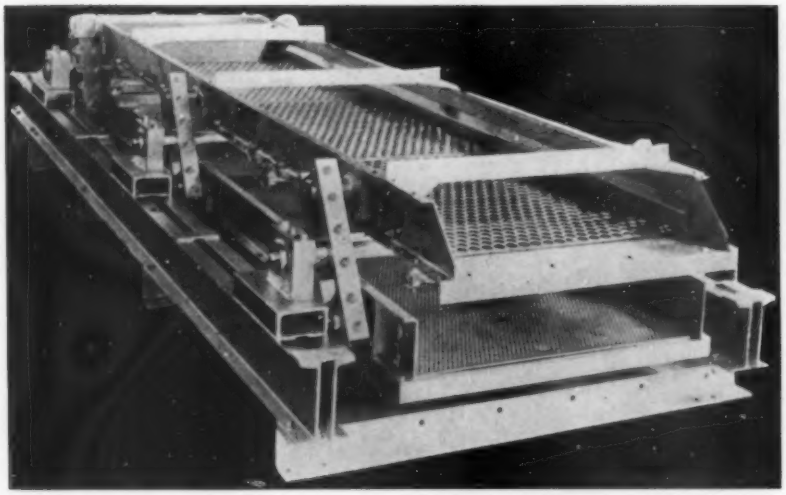


● BELOW: WHERE TRUCKS ARE REquired to operate in closely confined areas, the use of a turntable saves considerable time. The turntable illustrated was designed by Blaw-Knox Co. The mechanism comprises a circular pan on which the table turns.

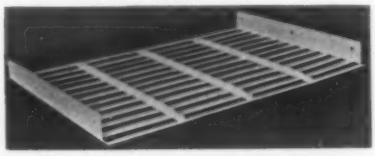
MANUFACTURERS' *Ideas*

● AN IMPROVED PUMP DESIGNED TO eliminate hydraulic losses is being marketed by the Pomona Pump Co. It was found by Pomona engineers that the fluid being discharged by the impeller element flows across the guide vanes at various angles and eddy friction losses are encountered. By forming the vane ends of a bulbous shape, it was discovered that regardless of the flow its direction would always be tangential to the vane surface.

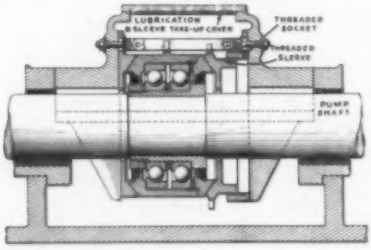
● BELOW: A NEW TESTING SIEVE shaker meeting Bureau of Standards requirements, has been placed on the market by the Newark Wire Cloth Co. This testing screen, known as the "End-Shak," operates at 150 strokes per minute, and the sieves revolve approximately one revolution per minute. It is said that the sieves are given a combined reciprocating and turning motion which causes the sample to spread uniformly.

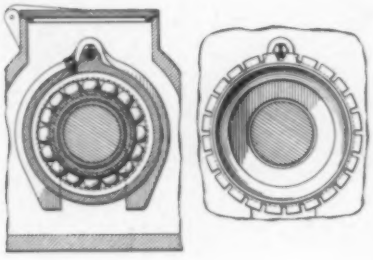


● BELOW: ELIMINATION OF FLAT particles is one of the primary functions claimed for the shutter picker developed by Hendrick Manufacturing Co. The shutter picker has flanges to use on a shaking screen for the removal of flat particles from stone, gravel and other granular materials. It is made with a series of blades which are pitched slightly upward and with an opening between the blades which is set to remove any definite size of flat particle.



○ ADJUSTMENT AND ALIGNMENT OF dredge pump bearings has been simplified in the new design patented by the American Manganese Steel Division of the American Brake Shoe and Foundry Co. The aligning feature, shown in the illustration below, is provided by the spherical surfaces on the outer cartridge faces. Adjustment is made by means of the threaded sleeve and socket arrangement.

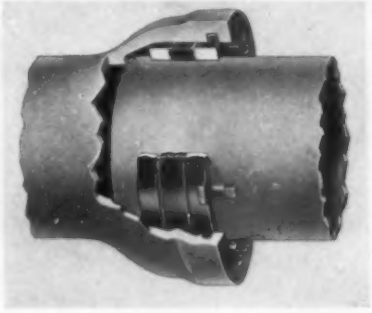




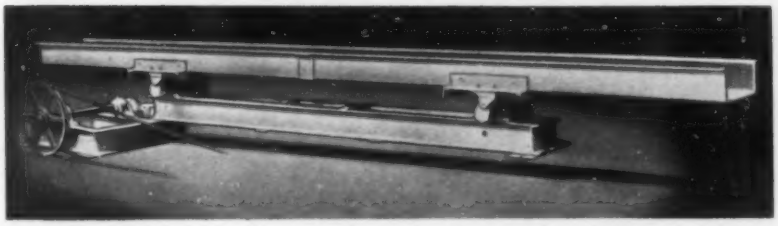
● BOTH A SHAKING AND A WHIPping action is imparted to the sizing and dewatering screen brought out by Hendrick Manufacturing Co., shown above. Flexible arms and free swinging decks not tied directly to the eccentric give it the whipping action at each reversal of direction. It has a height not in excess of 3 ft. 7 in., and a small radius of rotation, and operates at a maximum speed of 450 r.p.m. The drive is not directly connected to the screen decks, but is a separate unit which is readily accessible for adjustment or repairs. Eccentric drives are connected through the eccentric arms to a rocker shaft which carries the screen decks through flexible screen arms. Being approximately the same weight and moving in opposite directions, the screen decks are said to balance each other, eliminating plant vibration.

●

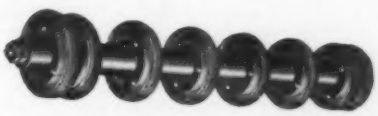
○ BELOW: A SIMPLE MECHANICAL cast iron pipe joint, known as the Bellmaster, Style 85, has been brought out by the Dresser Manufacturing Co. It is a single-gasketed, self-contained joint, consisting of an inner ring, armored gasket, outer ring, and a set of cap screws, all assembled in a single unit. To install, the joint is simply inserted in the bell end of pipe, locked in place by twisting slightly clockwise, spigot end "stabbed in," and the cap screws tightened. As the cap screws are tightened with a small ratchet wrench, the inner ring is drawn closer to the locked outer ring, thus expanding the gasket against the outside of the spigot and against the inside of the bell, making a tight seal against both.



Conveying Equipment

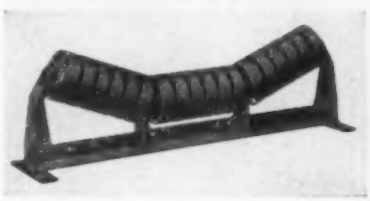


● VIBRATING TYPES OF CONVEYORS are being given more attention by producers in the rock products industry. In the illustration, above, is a vibrating conveyor and feeder called the Free-Flow which has been brought out by Standard Transmission Equipment Co. This equipment operates on the lift-throw principle with the motion of the trough becoming increasingly horizontal with the progress of each cycle, thus imparting a forward motion to the conveyed material. The trough of the conveyor is self-cleaning. Oscillating arms, which actuate the trough, are mounted in special rubber bushings, which store the forward and return forces, thereby reducing power consumption to a minimum. By means of variable speed control of the rate of oscillation of the trough, volume can be controlled. Material can be conveyed up inclines of 15 deg.

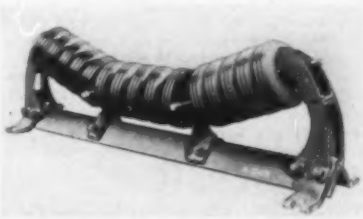


● ABOVE: RUBBER-TREAD IDLERS for supporting the return run of 14 to 60-in. wide belt conveyors have been developed by the Link-Belt Co. Each complete idler consists of from four to twelve 6-in. diameter rubber-tired rolls suitably spaced and mounted on a roller-bearing-equipped steel tube that will fit into the same supporting hangers as the regular Link-Belt return idler roll. Individual rolls consist of a renewable extruded rubber tire clamped between two steel discs firmly held together by three round-head bolts. As the rubber tire is made split, it can readily be replaced with a new tire when required by removing three nuts. These idlers are recommended for handling corrosive, wet, and abrasive materials.

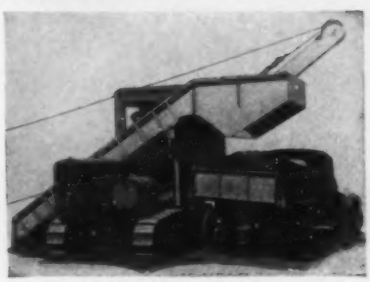
● BELOW: IMPACT RESISTING BELT conveyor idlers of the troughing type are made by the Link-Belt Co. It is a rubber tread idler designed to absorb the shock of receiving heavy, lumpy, and rough materials at the loading point. It is said that the cushioning effect of the rubber-to-rubber contact between belt and idler will prevent cutting, bruising and scuffing of the belt, and will protect the bearings and framework from shock, prolonging the life of both belt and the idler.



● BELOW: PNEUMATIC ROLLERS for belt conveyor carriers have been developed by Stephens-Adamson Manufacturing Co. These carriers are designed for use under loading spouts and in belt feeders where the impact of heavy bulk loads subject both conveyor belt and carrier to abnormal strains and wear. To cushion the impact of materials, the rollers in these carriers are made up of a series of pneumatic rubber units, 6-in. in diameter. The rollers in the impact carriers are mounted on the steel hub in which bearings and shaft are housed.



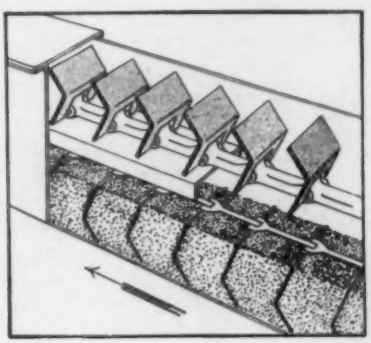
● AN UNUSUAL LOADING DEVICE developed during the past year is the crawler-mounted scraper-loader brought out by Sauerman Bros., Inc. This loader is equipped with an hydraulically controlled "teetering" ramp, and a 1-cu. yd. Crescent scraper bucket to which is attached drag cables 400 ft. long. Operating the scraper bucket is a power unit, comprising a double-drum hoist driven by either a 60-hp. gasoline or Diesel engine or by a 40-hp. electric motor. Power is furnished to the crawlers from a take-off on the hoist. This machine will load an average of eight 5-ton trucks per hour.



MANUFACTURERS' Ideas

● BULK CONVEYING OF MATERIALS is simplified with the use of the Bulk-Flo system, illustrated below, which was recently placed on the market by the Link Belt Co. According to the manufacturers, the Bulk-Flo system provides a positive and continuous method of conveying flowable and granular, crushed, ground or pulverized materials of a non-corrosive, and non-abrasive nature. Capacities range from one to 140 tons per hour. The conveying medium employs a specially designed chain, usually made of malleable iron, to which solid peak-top flights are rigidly attached at every pitch. These divide the material in the conveyor duct

into a continuous series of batches, which are moved positively by the peak-top flights, whether there be full load or only a partial load. These units may follow almost any desired pitch — horizontal, inclined, vertical or curvilinear, and a single self-contained unit may carry in all these directions in the same vertical plane. They may be fed or loaded at various points to suit conditions. Feed and discharge openings, also openings for inspection and access are readily provided in the conveyor casing. It is adaptable to the conveying of cement, and finely ground rock.

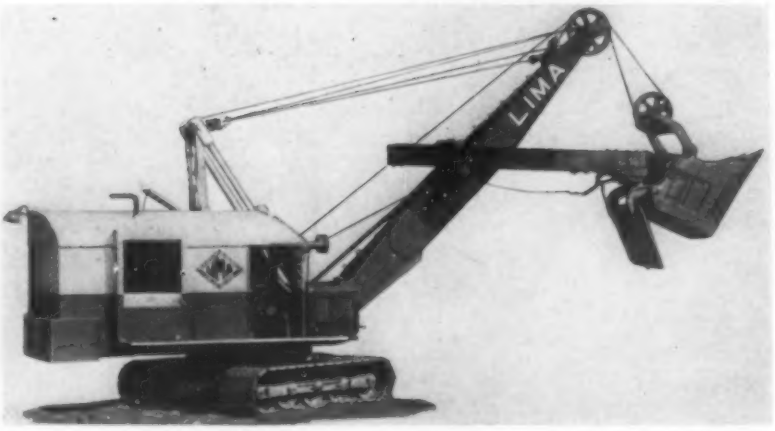


Excavation and Haulage

MANUFACTURERS' *Ideas*

● AIR-CONTROL IS ONE OF THE features of the type 70 shovel developed by The Osgood Co. The shovel, illustrated below, is rated as a 1¼-cu. yd. unit. As a crane, it is rated at 15 tons, but it also can be adapted to perform the duties of a dragline, clamshell, or pile driver. It is controlled throughout by air, except the hoist drum brakes. Due to air control, the type 70 is said to have the ability to lower heavy loads against the friction of the operating machinery and the compression of the engine. The main power clutch may be thrown out, and the hoisting clutch set by air, allowing the load to be backed through the gears.

● BELOW: A YARD CRANE WITH A gooseneck boom was placed on the market by the Buckeye Traction Ditcher Co. This design is said to provide greater stability under heavy loads, and facilitates car loading and unloading and working in close quarters. A gooseneck on the end of the boom facilitates handling of lengthy objects in a confined space. All operations in the work cycle of the crane, such as swing, boom raising or lowering and load hoisting, are controlled by vacuum power.



● BELOW: PNEUMATIC-TIRED, self-propelled cranes and shovels are coming more in use for war construction work. To meet this demand, the General Excavator Co. has brought out an improvement in its Supercrane design which is operated with one man and one motor. Some of the advantages claimed for this unit include mobility and the fact that it will go where any industrial truck will travel. It can lift and carry heavy loads with the boom in any position. The machine has a safe lifting capacity of 15 tons, and while it is primarily built for crane service, it can be equipped as a clamshell, dragline, pile driver, or pull shovel. Power is taken from the motor to the operating machinery by a twin-disc power take-off clutch. Swing and travel motions are controlled by twin-disc friction clutches.

● ONE OF THE LARGE CAPACITY shovels recently introduced to the industry is the 3½-cu. yd. unit of the Lima Locomotive Works, Inc., an illustration of which appears above. It has a 19 ft. boom and a 19 ft. 6 in. dipper handle, both of which are electrically welded throughout. Only three levers and two foot pedals are necessary to control the three major operations of hoist, swing, and crowd. Clutches and brakes have extra large diameters for effecting greater braking area, maximum lining economy and freedom from frequent adjustment. Each major operation is independent of the other which makes it possible to hoist, travel, swing, and boom up or down simultaneously. The crawler truck is composed of a one-piece base casting with five axles, on the ends of which revolve ten open-type self-cleaning rollers. Steering is accomplished from the cab with the upper frame in any position. The cab is rainproof and more than one-half of its area can be opened for ventilation in hot weather. A change from shovel to dragline or crane service can be made in the field.

● BELOW: A LIGHT-WEIGHT CONvertible shovel of ¾-cu. yd. capacity was brought out by the Link-Belt Speeder Corp. This Model 75 is of all-welded construction. The power plant is a heavy-duty gasoline or Diesel engine with a roller chain drive. External band clutches enable the operator to "feel" the load at all times. This sensitivity, plus external band brakes operated by automotive type pedals, is said to result in accurate control of the load and its placement. A large diameter turntable and long, wide crawlers give this model stability.

MANUFACTURERS' Ideas

● A LOADER MOUNTED ON A TRACtor is being manufactured by the Athey Truss Wheel Co. Known as the Mobi-Loader, this unit has been developed to provide fast, flexible, and economical loading, and has been designed for mounting on a new or used Caterpillar D4 or R4 tractor. An outstanding advantage claimed for this loader is its ability to transport materials without turning to discharge the load.

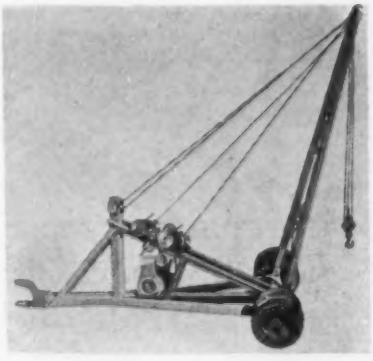
● A LARGE CAPACITY BUCKET TYPE loader has been introduced by George Haiss Manufacturing Co., Inc. The Model 80-W, equipped with pneumatic tires, is the wheel-mounted counterpart of the 80 type creeper-tread model. Its digging-loading mechanism is the same and also the loading capacity, 3 to 5 cu. yd. per minute, in heavy duty work up to the handling of the larger sizes of crushed stone. Road speed is up to 5½ miles per hour. Two speeds are provided both forward and reverse. Power crowding drive is geared for 18.6 ft. per minute. This model is powered with a 50 hp. gasoline motor. It is designed to provide a 11 ft. 4 in. clearance under the discharge chute at a 35 deg. setting which takes care of the high truck bodies now commonly employed. At a 50 deg. discharge angle setting of the chute, the clearance is 10 ft.

● SPEED IN MOVEMENT OF EQUIPment from job to job is made possible with the improved Model 705 Wm. Mobilcrane developed by The Osgood Co. It is operated by one man and one motor, and includes as features: air-control of all movements, an independent boom hoist, independent travel and swing motions, and hook rollers. A three-point suspension is used in the truck frame, which larely eliminates twist and strain when traveling over rough surfaces. When lifting, the front axle is provided with leveling jacks to keep the upper body on an even keel. The upper body is kept on the revolving base through the use of hook rollers. The gear-driven transmission provides four speeds, ranging from ¾ to 5 miles per hour. A heavy roller chain transmits the power from the differential to the tandem rear wheels, all driven.

● ABOVE: PORTABILITY IN DRILLing equipment is a definite trend in the rock products industry. Sullivan Machinery Co. has brought out a wagon drill which mounts 55 to 75-lb. hand rock drills. It is pneumatic-tired and drills at any angle.

● BELOW: STOCKPILING OF CONcrete products for curing, and sacked cement and other ground rock products is speeded up with the aid of the Model LT-44 unit recently brought out by the Towmotor Co. This unit also may be equipped with a crane arm and forks and a 10-cu. ft. shovel type scoop for handling bulk materials in narrow quarters such as railway box cars.

● BELOW: AN AUXILIARY PORTable crane and hoist was introduced by Diamond Iron Works, Inc., during the last year. The Porta Crane, as it is called, comes in three different models, A-40, B-40, and C-40. In the illustration may be seen the Model C-40 which is equipped with a small air-cooled engine mounted on a frame of the crane driving an oscillating countershaft through V-belts.

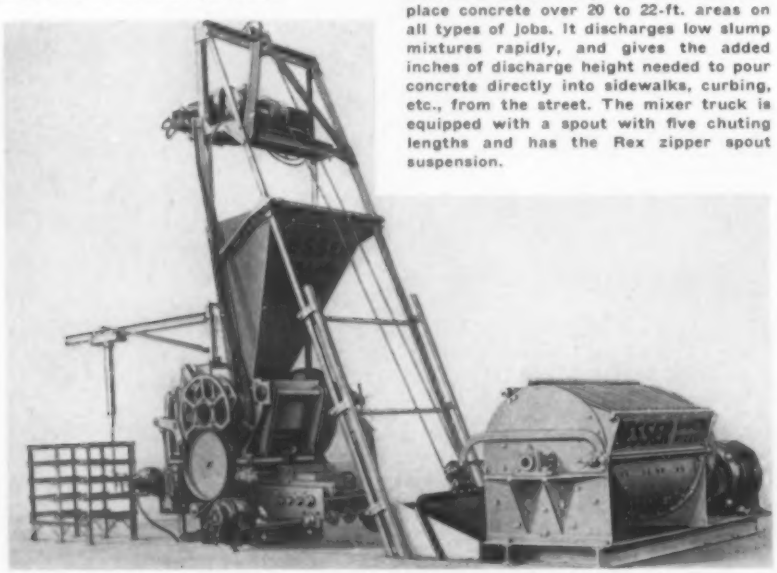


MANUFACTURERS' Ideas

Concrete Products - Agstone

● AN IMPROVEMENT HAS BEEN made in the Clipper stripper block machine by the Stearns Manufacturing Co., involving the manner in which power for stripping and strike-off operations is applied. Power feed, strip, and strike-off are all accomplished through the use of continuous V-belt drives.

● BELOW: IN THE ILLUSTRATION IS shown the latest development of the Besser Manufacturing Company's batch mixer with the skip loader mounted on the Besser Super Vibrapac. The block machine has a capacity of 600 standard 8- x 8- x 16-in. block per hour.

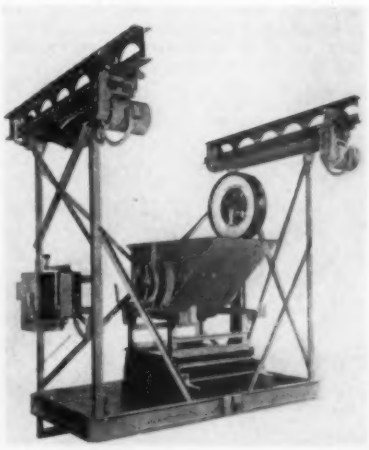


● LARGE DEFENSE CONSTRUCTION jobs have necessitated the addition of many new ready mixed concrete mixer trucks to fleets. In the illustration above is shown a fleet of 32 Ransome truck mixers ranging from 2½ to 4 cu. yd. sizes operated by the Transit Mixed Concrete Corporation of Norfolk and Richmond, Va.

● ABOVE: IMPROVED CONDITIONS for placing concrete are made possible by the newer high discharge types of transit mixers. In the illustration is shown a Chain Belt Co. Rex "Hi-Discharge" unit in a California plant. This unit can place concrete over 20 to 22-ft. areas on all types of jobs. It discharges low slump mixtures rapidly, and gives the added inches of discharge height needed to pour concrete directly into sidewalks, curbing, etc., from the street. The mixer truck is equipped with a spout with five chuting lengths and has the Rex zipper spout suspension.

● AGRICULTURAL LIMESTONE CONtinues as an important part of crushed stone production. The Flink Implement Co. has developed an agricultural limestone spreader which also is adaptable for spreading chips, sand, gravel and other materials. Many producers have found that their market has been increased through the loan or rental of the spreader. The Flink unit is a one-man operated, self-feeding end-gate type.

● BELOW: A TRAVELING BATCH scale has been brought out by the Cleveland Crane & Engineering Co. which has applications in the rock products industry. The car is motor driven and controlled by an operator who rides on the platform space provided to the left of the bucket. A variable speed drum controller permits the car to be moved at any speed up to 300 f.p.m. Double overhead rails make it possible to straddle overhead bins so that their chutes may be brought close to the car bucket. The scale on the car weighs ingredients as they are dumped in.

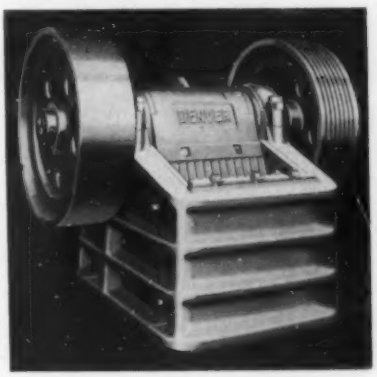


Crushers—Crushing Plants

MANUFACTURERS' *Ideas*

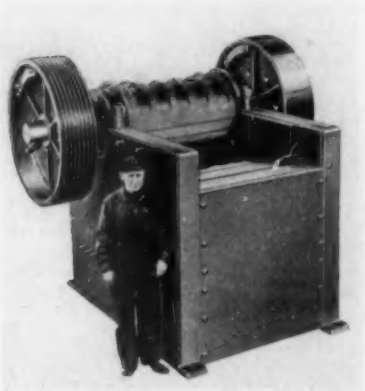
● PORTABLE CRUSHING PLANTS are being used on many defense jobs. In the illustration above is shown a double unit crushing plant capable of delivering large outputs of crushed gravel or stone which was recently placed on the market by the Austin-Western Road Machinery Co. The reduction unit comprises a 4022 model roller bearing roll crusher, a 4- x 12-ft. triple deck gyrating screen and a rotary return elevator, all mounted on a six-wheel, pneumatic-tired truck equipped with 30-in. feed and delivery conveyors. The primary unit consists of a 1036 jaw crusher with scalping screen mounted on a truck with a feed conveyor.

● BELOW: PORTABLE HAMMERMILL and bucket elevator unit made by the Williams Patent Crusher and Pulverizer Co. is shown in the illustration. The "Slugger" crusher unit is particularly adaptable to the crushing of agricultural limestone, but is capable of handling one-man size rock or screen rejects.



● ABOVE: A STEEL FRAME, ANTI-friction bearing type jaw crusher has been recently announced by the Denver Equipment Co. It is made in sizes ranging from 9- x 12-in. up to 15- x 36-in. The crusher bed is a one-piece electric steel casting, heavily ribbed and reinforced for strength and rigidity, and it is machined for receiving stationary jaw, wedge block, side plates, and anti-friction side bearing assembly. The jaw bumper or pitman is a heavily reinforced steel casting, and the crusher jaws are of manganese steel or a special wear resisting chrome alloy steel, depending on the material being crushed.

● BELOW: A LARGE CAPACITY portable crushing plant was brought out last year by the Iowa Manufacturing Co. The Morok type now has a capacity of 150 to 200 tons per hour. It is built in three major units, each mounted on pneumatic-tired trucks. It comprises a primary unit with a jaw crusher to handle rock direct from the quarry, a belt conveyor taking crushed material to the secondary plant equipped with a roll crusher and a 4- x 12-ft. vibrating screen, and then followed by a bin unit with a second screen of the same size for final grading.



● LARGER SIZE JAW CRUSHERS ARE now made by the Pioneer Engineering Works. The most recent development is a 30- x 42-in. unit which has been streamlined in design. It has a different type eccentric for this type of crusher. Manganese steel jaws, SKF self-aligning spherical roller bearings, and a worm and gear adjusting mechanism are other features.

● BELOW: A CRAWLER-MOUNTED blast hole drill has been brought out by The Keystone Driller Co. Model 51 has a structural framing employing a combination of welding and riveting. Perpetual shock, which must be dealt with in the design of a blast hole borer, is met in this unit by the use of very large, short span shafting and anti-friction bearings of ball or roller types; by transmitting power to the drilling crank through a heavy shock neutralizing, multi-cord belt and by a system of masthead shock absorption. The machine incorporates the Keystone system of spudding motion and stroke adjustment, a power derrick-raising device and pantograph tool guide. It is mounted on full crawlers which are independently driven.

DENVER EQUIPMENT COMPANY

1400 SEVENTEENTH ST., DENVER, COLORADO

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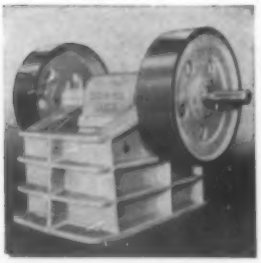
CHICAGO, ILL...Suite 1005, 69 W. Washington
TORONTO, ONTARIO...45 Richmond St., W.
MIDDLESEX, ENGLAND.....South Harrow
JOHANNESBURG, S. AFRICA..8 Village Rd.
MEXICO, D. F..Edificio Jalisco, Calle Ejido No. 7
SANTIAGO, CHILE.....LIMA, PERU
RICHMOND, AUSTRALIA....Victoria Street

"COMPLETE MILL EQUIPMENT FROM CRUSHER TO FILTER"



DENVER JAW CRUSHERS

The Denver Forced Feed Jaw Crusher is simple and has but few wearing parts. It is well adapted to coarse and fine crushing due to the forced feed principle. Rugged construction is used throughout including ribbed reinforced frame, chrome-steel eccentric shaft, roller bearings, and heavy reinforced steel jaw bumper. Jaws are of manganese steel and are reversible. Bulletin No. C12-B describes bronze bearing crushers and Bulletin No. C12-B1 anti-friction bearing crushers.

DENVER BALL MILLS

Denver Ball Mills are made with rolled steel shell and give the highest capacity because the diameters are measured inside the liners. Unique construction makes it possible to double the capacity by bolting two shells together, and strong design permits use of the same trunnion bearings. Denver Ball Mills are made in 30", 2', 4', 5' and 6' diameters and in ball, rod, or tube mill lengths. Write for Bulletin No. 38-B1 containing valuable capacity chart.

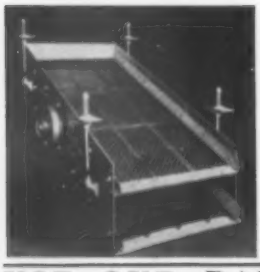
DENVER CLASSIFIERS

Denver Rake Classifier (Heavy Duty Type) is of welded steel design which is much stronger than the heavier cast iron type. Tank is made of heavy steel plate, double electric welded inside and out; bearings are babbitted or machined; gears are heavy semi-steel cut tooth; rake lifting device has worm gears, crank and steel cable.

The Denver Rotary High Weir Classifier is the spiral type; made with replaceable wearing flights.

HYDRO-CLASSIFIERS

The Denver Hydro-Classifier is designed for "24-Hour Service." A totally enclosed head motion of distinctive design has a hardened and ground steel worm integral with worm shaft and carried on SKF ball bearings. The drive shaft can be raised or lowered while the machine is operating by a conveniently mounted handwheel. Spiral rakes rolled from structural steel shapes heavily braced and reinforced convey settled material continuously to discharge.



VIBRATING SCREENS

The Denver-Dillon Vibrating Screen embodies a basically different principle in the application of circle-throw motion. No outboard bearings are required since entire weight and load are carried on four spring-cushioned rubber-insulated suspension rods. Horsepower requirements are half of the average. Get Bulletin S3-B3.

Do you have data on Denver Mineral Jig which is described in Bulletin J2-B and Bulletin No. 38-T1 on Denver Tables?

DENVER FILTERS

Denver Continuous Rotary Filters successfully handle finely ground materials so as to secure the best washing and drying of filter cake. The all metal construction with cast iron filter segments bolted to heavy steel ends, eliminate leakage and warping so common in wooden types. An agitator in bottom of tank keeps pulp in suspension. Pipe connections to the valve are outside of drum and are easily accessible. The 6' Denver Filter at the right is operating in a talc plant. Bulletin F8-B.

DENVER FLOTATION

Denver "Sub-A" (Fahrenwald) Flotation Cells are standard the world over and are used to concentrate or beneficiate non-metallic as well as metallic minerals. Distinct advantages include circulation of coarse material, elimination of choke-ups, and no pumps or elevators are needed to recirculate products. At right, Denver "Sub-A" Cells operating in non-metallic mill. Write today for Bulletin F11-B.

Wet and dry reagent feeders are available in many sizes.

DENVER THICKENERS

Denver Thickeners are built in the lowhead beam type design (shown at the right) in sizes up to and including 75'. The beam design gives maximum headroom and flexibility, ideal for milling and industrial applications. An outstanding feature is the patented spiral rake which immediately moves the material to the center. Bulletin 3628.

Ask for Bulletin No. P8-B describing Denver Adjustable Stroke Diaphragm Pumps; sizes 2", 3", 4", 5" and 6".

DENVER SAND PUMPS

Pulp flows direct by gravity to pump bowl and is drawn into pump chamber by vortex action. It is an ideal unit for handling flotation concentrates, frothy and sandy pulps. The pump is designed with unit bearing housing with all vulnerable parts away from splash. Wearing parts are accurately designed for easy replacement and these may be furnished of several materials. Pump can be furnished in six discharge sizes. Obtain Bulletin No. P10-B.

ORE TESTING FACILITIES

A complete laboratory testing service is available under the direction of competent metallurgists. Tests can be made by gravity concentration, amalgamation, cyanidation, flotation. Bulletin 3713.

At the left is a general view of our continuous testing laboratory. This plant is available for any company's use at low cost . . . the research staffs of large companies have used these facilities with profitable results. Bulletin T4-B3.

USE OUR BATCH AND CONTINUOUS TESTING FACILITIES

Producing A Superior Hydrate

Lime to be hydrated should be finely pulverized, and should receive the water quickly and be mixed without delay

By VICTOR J. AZBE

RECENTLY on a visit to a rather good lime laboratory we found the chemists puzzling over some results that were contrary to what was expected. Hard and soft burned kiln lime was hydrated and the hard burned showed a higher plasticity than the soft burned.

But degree of burning is not the sole factor determining quality of hydrate, as much can happen to lime during hydration. Improperly burned lime can, to a considerable extent, be resurrected by suitable hydrating methods, and conversely, good lump lime may give an inferior product when damaged in the hydrator. This latter condition can very readily happen, so readily that we can only wonder that hydrate ordinarily is as good as it is.

In any case, all hydrates are composed of good, poor, and indifferent portions; ordinarily it is the predominating portion that determines the general quality as expressed by particle size, reactivity, solubility, and plasticity, although in the case of plasticity, this is not so certain, and a comparatively small portion may act as a vehicle for the general mass.

The lower the temperature of hydration, the higher the quality. High temperatures coarsen the hydrate,

LIME FORUM

Mr. Azbe, consulting engineer, is a contributing and consulting editor of ROCK PRODUCTS. He will be glad to receive inquiries from his readers, and will answer these direct or through the columns of this Forum.

and they mean that lime got its water slowly, or in insufficient amounts, probably due to improper distribution due to insufficient mixing.

But low temperature in the hydrator still does not mean that hydrate is made at low temperature, as exceedingly high temperatures may prevail internally in the lumps, while the temperature of the general mass, as recorded by the thermometer, may be quite low.

Fig. 1 shows temperatures prevailing internally of hydrating, soft burned masses, of dolomitic and high calcium lime of only ½-in. diameter. As soon as water vapor was admitted, temperature of lime started climbing, and in 1¼ minutes it was over 900 deg. F., although the surrounding atmosphere was only 212 deg. F. The lime reached the equilibrium point in temperature, beyond which further temperature rise was impossible, and at which point hydration stopped. Beyond this point hydration could only continue at the rate the heat was lost and the larger the piece or greater the mass of occluded lime the longer it will remain hot.

Low Temperature Hydration Essential

Water added to lime has two purposes: one to combine and form hydrate; the other to evaporate and so cool and carry off the heat of hydration. If only enough water finds access to cause hydration, lime will be

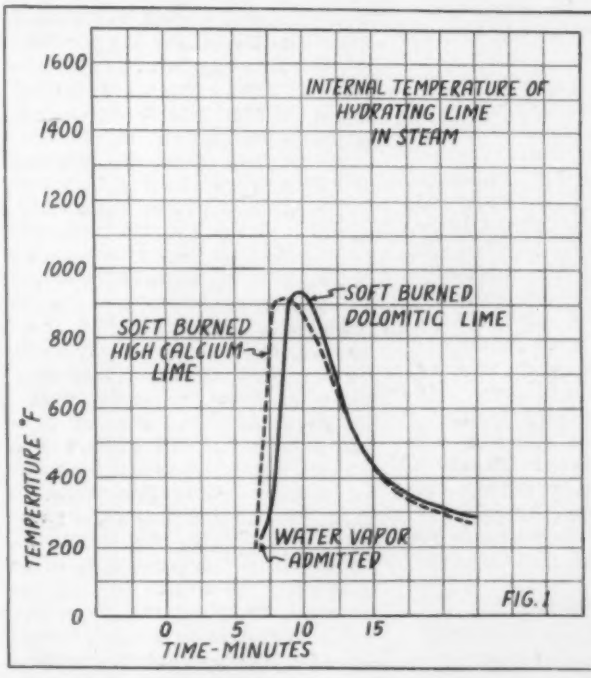


Fig. 1: Shows temperature curves prevailing internally of hydrating, soft burned masses, of dolomitic and high calcium lime of only ½-in. diameter

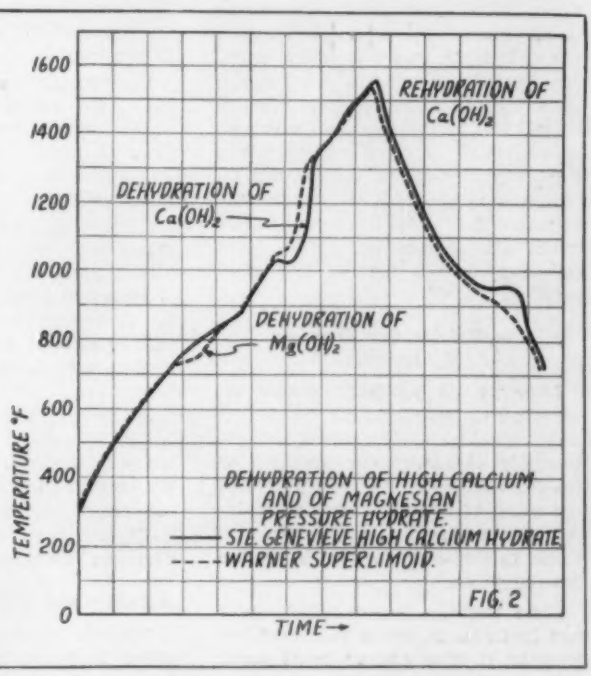


Fig. 2: Two curves, one for high calcium hydrate, and the other for magnesian pressure hydr[illegible]

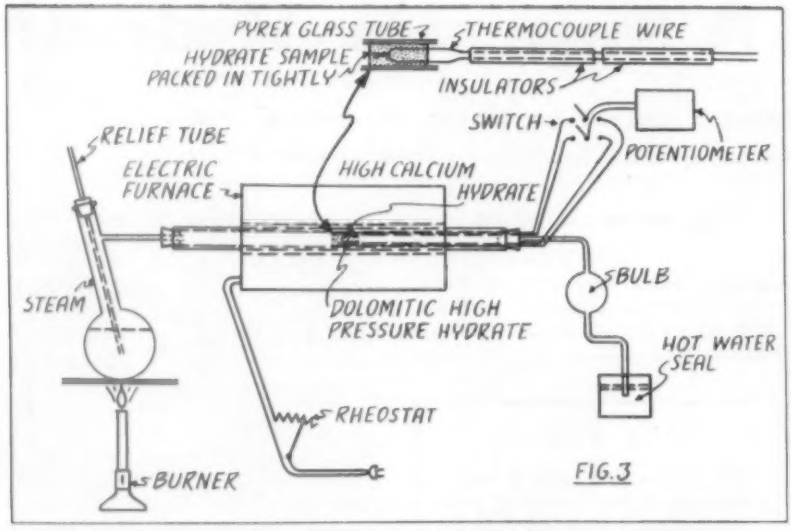


Fig. 3: Apparatus for determining points at which hydrate loses water

extremely hot, hot far beyond what one would be led to believe from the use of any sort of thermometer. Such hydrate will be coarsely crystalline, quick settling, unplastic, slow to react or dissolve.

Some lime producers having high calcium lime, in their efforts to produce a special hydrate of plastic nature, go to all sorts of complications to secure low temperature hydration. One concern uses a rather large amount of excess water, giving a wet hydrate, which is later dried. Another hydrates wet lime, then dries it by the addition of a small amount of quick lime. Still another markets moist hydrate in water proof sacks, and in all the purpose of the water is to keep the hydrate temperature down. But all of them somehow or other violate the proper principle, through insufficient pulverizing or improper distribution of water or insufficient mixing which gives at least some high temperate hydrate, thus reducing the quality of the final product.

Conditions for Proper Hydration

Lime to be hydrated should be finely pulverized, it should receive its water quickly and be mixed with it suddenly to assure the presence of the full amount of cooling water with the water of hydration, and pulverizing also makes it possible for this water to find quick access to all the lime particles.

Lime that is denied liquid water and hydrates in steam will form hot hydrate. It is only when liquid water comes in contact with the quick lime surface and is drawn up by its capillarity, that enough water can find access to both hydrate and cool, and not even then if the pieces are too large.

It is known that low temperature high calcium hydrate is quite plastic, while ordinarily produced high temperature hydrate is not. This would apply as much to dolomitic as to high calcium lime. In Ohio, when the finishing lime producers have trouble in getting the desired plasticity, caused probably by some overburning, this condition could quite likely be corrected by a hydration method which would assure a low temperature and thus realize in full such plasticity as the high calcium portion may be able to contribute.

Through an apparatus, shown by Fig. 3, the points were determined at which hydrate loses its water. Fig. 2 gives two curves, one for high calcium hydrate, the other for magnesian pressure hydrate. It will be noted that dehydration of $Mg(OH)_2$ is much below that of calcium hydrate. This would indicate that when lime is hydrated hot, the heat generated by the hydration of calcium oxide will be so high as to dehydrate any magnesium hydrate that may be present.

However, ordinarily $Mg(OH)_2$ forms so slowly that there is not likely to be much there to dissociate, but be that as it may, to improve the calcium portion is worth the effort in itself, and that can be done only by dropping the internal temperatures.

Advice on Patents

"PATENT BACKGROUND FOR ENGINEERS" is the title of a 54-page booklet recently issued by the Allis-Chalmers Manufacturing Co., Milwaukee, Wis. It is now ready for distribution. The booklet was written by patent attorneys and engineers for the lay mind eliminating legal verbiage. Articles cover such subjects as basic patent considerations; the importance of the drawing, specification and claims in evaluation of patents; patent fallacies; the protection of new inventions, the safeguarding of inventors' rights, importance of determining the original inventor, joint inventorship, whether or not to shroud an invention in secrecy, public or experimental uses of inventions; the effect on product sales of an invention prior to patenting; the trend and development of American patent law; what compulsory patent licensing would mean, streamlining patent prosecution, and trade marks.

War Law Requires License for Use of Explosives

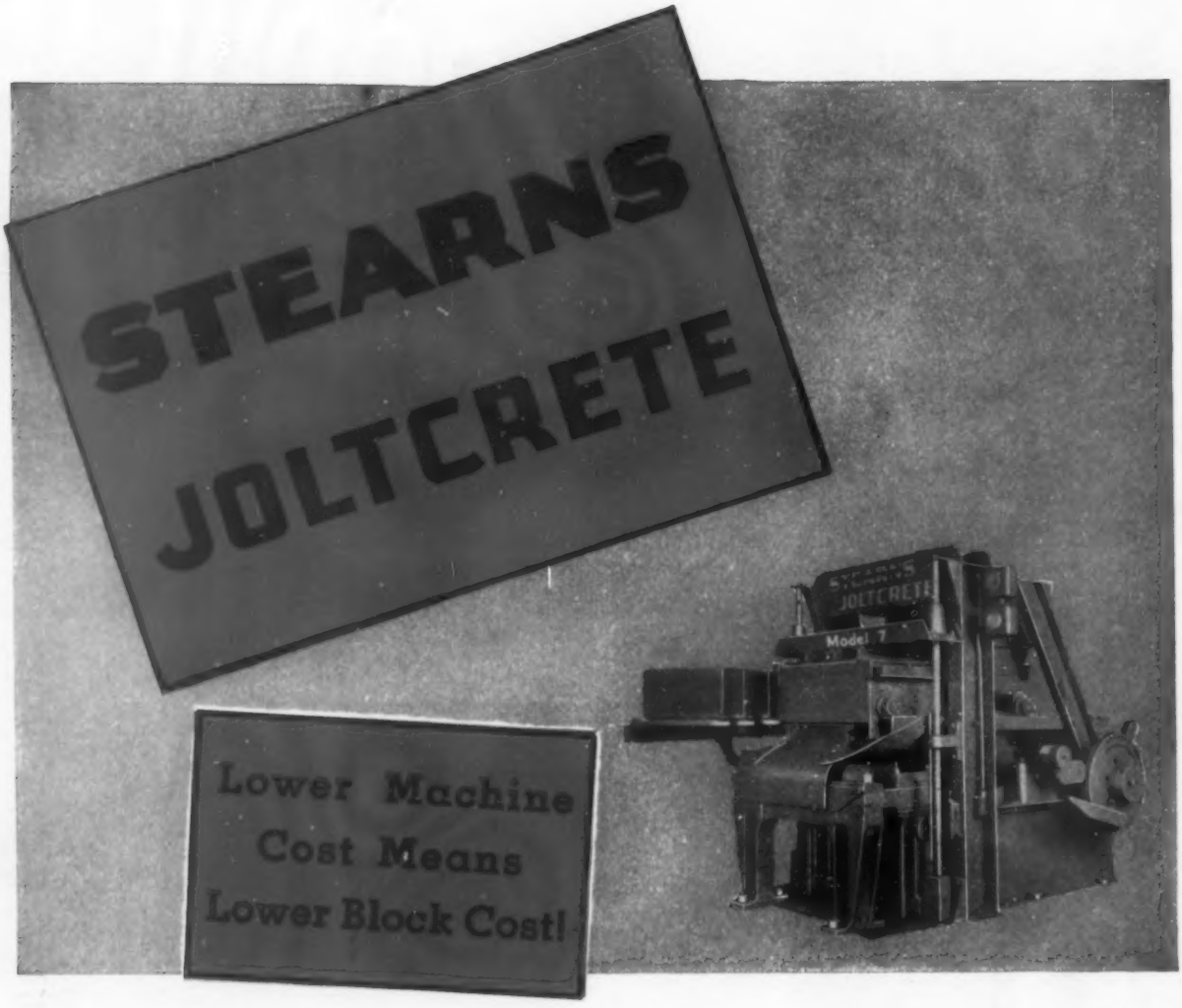
WITH the declaration of a state of war, the Federal Explosives Act of October 6, 1917, which prohibits the manufacture, distribution, storage, use or possession of explosives, or the ingredients of explosives, unless a license has been obtained from the Director of the Bureau of Mines, is now effective. Dr. R. R. Sayers, Director of the Bureau, in making the announcement said that the only exemption would be explosives used by the Army and Navy.

A revised version of the 1917 Act has been passed by both Houses of the present Congress, but in its essentials it is similar to the original law. Personnel to act as licensing officers for the Bureau now are being selected, forms are being printed, and all other preparations are being made to put the provisions of the law into operation immediately. All manufacturers, vendors, purchasers, analysts, educators inventors, investigators, and foremen and other users, except workmen who obtain their explosives from licensed foremen must obtain a license under the terms of the law.

Explosives are defined in the law as "gunpowders, powders used for blasting, all forms of high explosives, blasting materials, fuses, detonators, and other detonating agents, smokeless powders, and any chemical compound or mechanical mixture that contains any oxidizing and combustible units, or other ingredients, in such proportions, quantities, or packing that ignition by fire, by friction, by concussion, by percussion, or by detonation of, or any part of the compound or mixture may cause such a sudden generation of highly heated gases that the resultant gaseous pressures are capable of producing destructive effects on contiguous objects, or destroying life or limb."

CONCRETE PRODUCTS AND CEMENT PRODUCTS

Attractive concrete block office and advertising display of Dishman Ready-Mix Concrete Co., Spokane, Wash. Jack Martin, progressive head of the company shown to the right



THE initial investment for a Stearns Joltcrete Block Machine is often as little as half the price asked for other equipment of comparable capacity. The lower overhead represents an *extra* saving on every block made.

ANNOUNCEMENT
of Important Improvement

New base construction on all No. 9 Stearns Joltcretes has demonstrated these four important advantages:

1. Denser blocks.
2. Longer life of parts subjected to vibration.
3. Less frequent need of adjustment.
4. Quieter operation.

Write for complete details.

Write for full description and prices of Stearns Joltcrete Machines that make concrete masonry units by the patented process of limited amplitude vibration.

STEARNS
MANUFACTURING CO. - ADRIAN, MICH.
GENE OLDEN, PRESIDENT

Also tamp equipment, mixers, skip loaders, etc.

Speed Up Defense Work Using Ready Mix

Battle Creek Gravel Co., turns large percentage of sand and gravel production to ready mixed concrete for airport and army camp construction

By RALPH S. TORGERSON

John Postma, manager of the Battle Creek Gravel Co.

WHEN DEWEY D. BATTJES, president of the Battle Creek Gravel Co., decided to go into the ready mixed concrete business in 1940, this country was just getting under way with its big defense program. His decision proved to be very timely as the new ready mixed concrete and sand and gravel plants are located only one mile from Fort Custer and the big army training airport now nearing completion, and three miles from Battle Creek, Mich.

Ready mixed concrete operations started in July, 1940, with a capacity of 40 cu. yd. per day, and have grown continuously. Transit mixer equipment includes three Jaeger units, two on General Motors and one on a Chevrolet chassis. The batching plant furnished by Butler Bin Co., comprises a three-compartment, 75-cu. yd. bin, and a three-beam scale with bin dumping control levers.

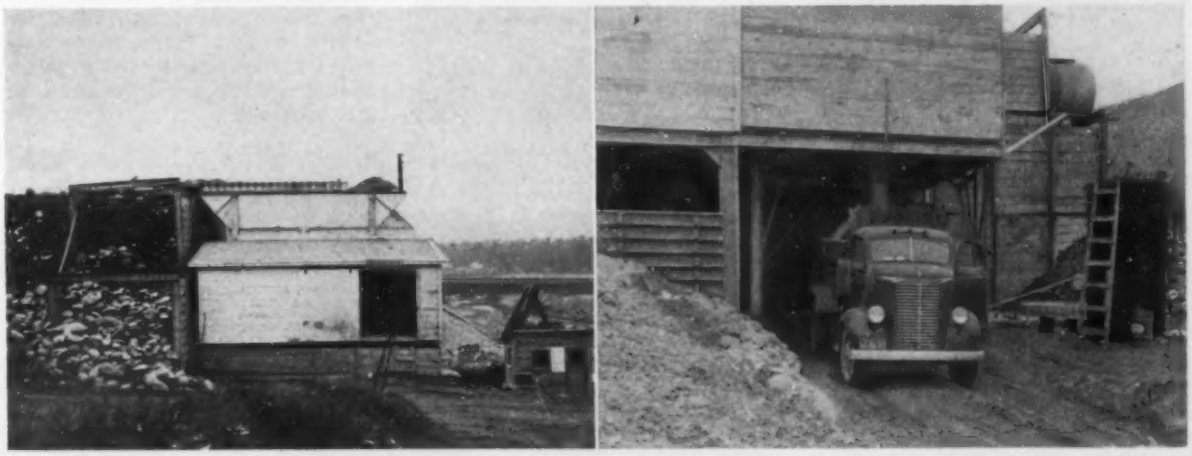
It is a comparatively simple plant with a gravity flow of materials. As shown in the illustration, an earth-fill ramp was built up to the top of the three-compartment bin with a roadway over the bin so that trucks may dump into trap door openings. Aggregates are obtained from stockpiles of the nearby sand and gravel plant operated by the same company.

As shown in the illustration, the plant supporting members are of structural steel with a concrete foundation and retaining wall on one side over which there has been built a wooden structure in which the weighing and control apparatus has been housed. This arrangement provides a driveway on the opposite side of the retaining wall for the mixer trucks to receive their loads of aggregates and cement from above. The regulation type water tank for mixing is carried on the mixer trucks which renew their supply from a large steel tank supported above on steel structural members.

Loading aggregates from large stockpile into truck for delivery to ready mixed concrete plant bins

An improvement now under way

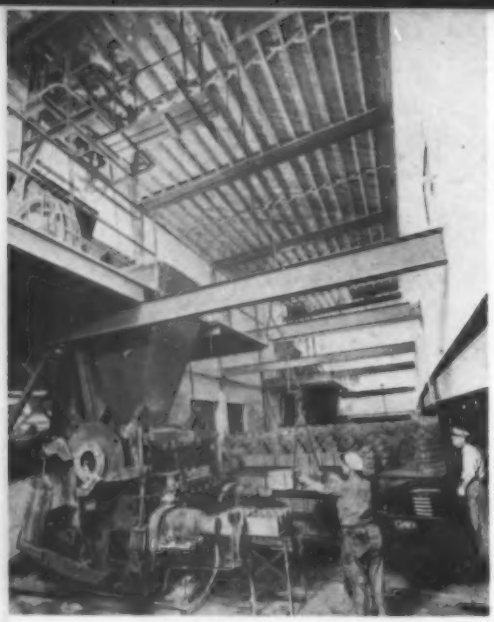
(Continued on page 133)



Left: New ready mixed concrete batching plant of Battle Creek Gravel Co., receives aggregates over ramp to top of plant. Right: One of the modern transit mixer trucks ready to pull away with a load. Note boiler, to the right, which is being installed to heat aggregates and water

Concrete Products Industry Sets All Time Record

Large housing projects and defense plant construction boost sales to 500 million units. New precast methods of manufacture of wall, roof, and floor members have been developed to increase production



Inside of Maule Industries plant which is setting production records for others to shoot at. Each of these vibrating block machines has a production capacity of 600 8-in. block per hour. The machines have 40-cu. ft. mixers served by skip loaders

Another interior view of Maule plant, showing storage space for 12,000 block, with block machines in the background. Block are held here for 24 hr. and then transferred to yards where they are kept under sprinklers for 48 hr.

CONCRETE MASONRY has just completed the biggest year in its entire history. Sales will probably total nearly 500,000,000 units, which is far above any other year. Much of the volume during the year has been due to the construction of large metropolitan housing projects, defense housing projects and for general industrial building.

Large Production Record

Large eastern centers, principally Baltimore, Md., and Washington, D. C., are going through a period where there is a shortage of concrete masonry units and importations are coming from other cities. One large producer, with a potential daily capacity of 38 units per minute, contracted for the complete production of a new plant nearby, in order to supply his regular customers while serving several large projects. A few years ago, merchandising was the principal activity, today it's all production, but the more active manufacturer is planning ahead for business after the war construction is over and is taking care of his regular customers as best he can.

The production record for the year will probably be set by Maule Industries, Inc., Ojus, Fla., with an output in the neighborhood of 8,000,000 units. During a one-month interval last Fall, this concern, operating two Besser Vibra-Pac machines, produced 625,000 units. For that period the inventory showed another 125,000 units to have been drawn from stockpiles, making a total of 750,000 units sold in one month. Large federal housing projects, in Key West and Fort Lauderdale and one in Miami, for housing navy personnel, took a considerable part of the volume. Normal production during the year has been 20,000 block per day on a two-shift schedule. The company operates a fleet of 39 Ford and Chevrolet trucks, with platform bodies, to serve company supply yards and deliver direct to customers. Aggregates are oolite limestone rock processed near the block plant.

Big Market from Housing Projects

Federal housing projects have established concrete products in some communities. In Paducah, Ky., for instance, Katterjohn Concrete Products has been furnishing several hundred thousand gravel and cinder concrete blocks on housing alone. The Thomas Jefferson Place Housing Project is one, consisting of 13 separate buildings which comprise 125 apartments for white occupancy. Abraham Lincoln Court, with 75 apartments for colored tenants, is another. These projects were built by the Paducah Municipal Housing Commission, with U.S.F.H.A. aid.

Special device for lifting concrete units out of production line on right, in the Cementone Co. plant, Pittsburgh, Penn. Production line is the full length of the building, with a centrally located batching plant for the travelling mixer

Units required were 8- x 8- x 16 gravel block for foundation partition wall on the first floor, 8- x 8- x 16 cinder block for load-bearing partition walls on the first and second floors, 5- x 8- x 16 cinder block as backup for 4-in. face brick on the first floors, 4- x 8- x 16 cinder block for brick backup on the second floors, and 3- x 8- x 16 cinder block for all interior partitions.

This concern also sold 120,000 units for a housing project at Madisonville, Ky., built entirely of 8- x 8- x 16-in. cinder concrete block, painted outside and plastered on the inside. The Katterjohn plant is equipped with a Stearns No. 7 Joltcrete block machine, served by a Stearns 18-cu. ft. mixer and skip hoist and produces 2000 standard 8-in. units in 8 hr.

Larger-sized prefabricated concrete units will probably extend the activities of the concrete products industries, and new developments in precast concrete will come about to fill the continually increasing requirements for speed in building construction. Already progress has been made in this direction, and in adapting certain units to displace steel structural members.

Prefabricated System

The prefabricated concrete construction system of the Cemenstone Co., Pittsburgh, Penn., has been offered as a means of speeding up defense plant construction. The system consists of specially engineered columns, girders, long and short span flooring, roof slabs and wall panels, all the units being made of precast reinforced concrete.

This system has the flexibility to permit the manufacture of a wide variety of units on mass production principles because of an unusual and original operation layout. The plant consists of a stationary mold assembly line running the length of the entire plant building, a self-propelled concrete mixer having a travel in either direction over the production line from a central station where it is charged, overhead hoisting equipment for handling units out of the molds, accurate batching equipment and a large storage area under cover. Making the various shapes of prefabricated units is a matter of fitting the required steel molds into the production line.

The mixer is self-propelled on rails spanning the mold assembly line and the mixer car is fitted with screeds at each end. The principle of manufacture is based on the use of a rich plastic mix and accelerated curing, with high early strength cement, in order to release molds on one-half the production line in time for a repeat pour when the mixer has poured the other half.

Curing is particularly interesting, and is a process of the application of heat by radiation rather than steam vapor. Heat is applied during and after a pour and is followed by a 7-day curing period under cover. All the cores are hollow and the entire supporting structure, side plates and molds are hollowed out. Live steam is forced through piping into these hollowed-out areas to transmit heat to the concrete through the steel plate. The molds are vibrated by electric vibrators as the concrete is poured. A special pickup device removes the units, in groups, from the production line for transference to stockpiling.

Interior of the Katterjohn Concrete Products plant at Paducah, Ky., which is producing hundreds of thousands of concrete units for federal housing projects

This housing project in Paducah required close to 200,000 concrete units. Gravel block went into foundation partition walls, cinder units for partition walls and for backup to brick

Precast concrete joists, of certain designs, are being accepted for many types of construction, and can take the place of structural steel in many applications. Formigli Architectural Stone Co., Philadelphia, Penn., specializes in designing and manufacturing Lith-I-bar reinforced concrete joists for large building construction only. A new development by the company is the adaptation of these joists as structural tie members as well as load carrying members in large size buildings. Appropriate tie flanges are welded to the standard reinforcing unit before making the joists, for bolting on to the structural steel in the building, thereby tieing into the steel frame of the building. Recently the company was awarded a large apartment job for joists because it was able

(Continued on page 128)

Mixer in the Cemenstone plant, which is self-propelled on rails, and which travels in either direction over the production line to fill the molds. Some standard block may be seen in the foreground

Showing different types of reflecting curb made by Formigli Architectural Stone Co., for the New Jersey Highway Department

Casting Concrete Curbing

Separate department set up by Formigli Architectural Stone Co. to manufacture reflecting concrete curb for highways

By BROR NORDBERG

REFLECTING CONCRETE CURB, both precast and cast-in-place, are coming into more general use by state highway departments in building new divided highways or in transforming existing multi-lane pavements into divided highways. The purpose of these light-reflecting curbings, of course, is to help separate opposing streams of traffic and to make night driving safer.

New Jersey has been particularly active in developing different designs of curb. Designs now in use are based upon studies to determine the best methods of breaking up and reflecting the rays of headlamps to outline the borders of the traveled roadway at night. A white, glass-like exposed surface, in concrete is required, of various shapes and fin spacings (see sketches) to secure the maximum degree of light reflection.

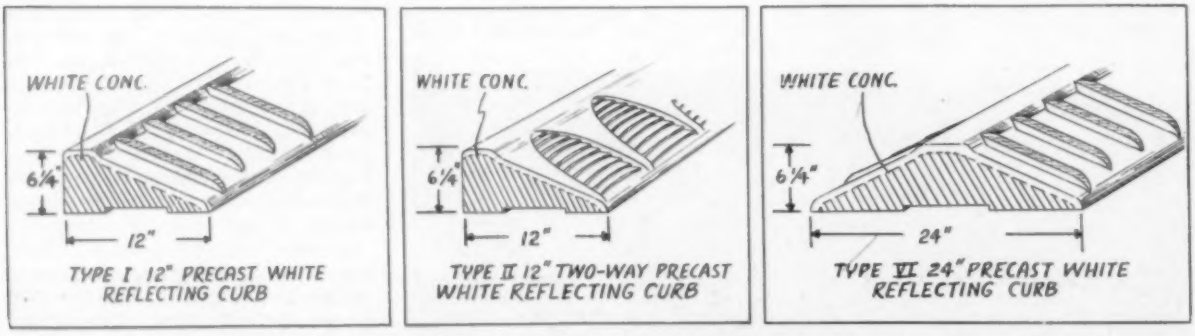
Formigli Architectural Stone Co. has been manufacturing precast light-reflecting curb at Berlin, N. J., for the New Jersey State Highway Department for the last four years. At the time this article was written, the company had on order 40,000 lineal feet of curb, of one-way design for straightaway traffic right and left side, and two-way for radius returns in the road.

Require White Cement and Careful Workmanship

Specifications for precast curbing are very exacting and contain special provisions which are not experienced in making any other kind of precast concrete. They require special types of forms, special aggregates with white portland cement and a high degree of workmanship not called for in other concrete products.

Precast curbs are usually made in three standard lengths within the range of 6- to 9-ft., with some special lengths. They are laid in a mortar bed on top of the existing pavement with ⅜-in. joints between the separate units. Each unit has a core of grey concrete with a facing of white portland cement concrete at least one inch thick.

The kind of aggregates used has a bearing on the light-reflecting properties of the curb and the sources of supply must therefore be restricted to meet these requirements. For the



Construction details of different types of reflecting curbing made by the precast concrete process

Now It's the New #3½ SMITH-MOBILE

BIG CAPACITY
Larger 165 cu. ft. drum volume—permits a much bigger payload.

Forging Ahead in Truck Mixer Design

Five years ago Smith-Mobile made its appearance with the industry's first really important changes in truck mixer design. It is the *1st* machine that provided for HIGH DISCHARGE without a hoist . . . *1st* with a CONTROLLED DISCHARGE without segregation... *1st* with VISIBLE MIXING... *1st* with FEED CHUTE charging... *1st* to introduce water through the feed opening.

Today, Smith-Mobile is the acknowledged leader in the industry with an enviable record of achievement. Its many distinctive features have been thoroughly field-tested. More than 700 machines are now in active service.

Ratings
3½ cu. yds. for truck mixing . . . 4½ cu. yds for agitating.

Backed by this broad, successful experience, Smith Engineers have developed a new, compact, streamlined truck-mixer — the No. 3½ Smith-Mobile. With its larger 165 cu. ft. drum volume, this new machine permits bigger payloads, yet it actually weighs less than competitive 3-yard truck mixers. It's faster all the way . . . in charging, mixing, discharging . . . especially for the drier and stiffer mixes. Write for complete Smith-Mobile Catalog No. 198-B — it's just off the press.

The T. L. SMITH CO., *2885 N. 32nd St., Milwaukee, Wis.*

LIGHTWEIGHT
New, compact design effects weight economy — increases efficiency.

CONCRETE MIXER MANUFACTURERS SINCE 1900

A 3603-1P

Stockpile of finished reflecting curb after the units have been cured under covered storage, shown in the background

Empty concrete mold for curb which are pneumatically-vibrated face-down. Note pneumatic hose connection

Above: Casting reflecting curb on pneumatically-vibrated tables

Below: Putting in the grey concrete core after white concrete facing has been vibrated into place

white cement mortar, the sand may be either quartz sand, crushed limestone, granite or marble but cannot contain iron or other materials which would color the mortar. White quartz sand is limited to a maximum of ½ percent material which can be removed by elutriation, with an allowance of 1 percent for the alternate sands which may be used.

Sand must be graded as follows:

Passing	Retained	Percentage
¼-in.	10-mesh	0-20
10-mesh	30-mesh	5-60
30-mesh	50-mesh	20-60
50-mesh	200-mesh	10-45
200-mesh	——	0-5

Coarse aggregate for the white cement concrete must be a light-colored gravel, limestone or granite of ⅜-in. or pea gravel size, free from dust and dirt. For the grey concrete core, aggregates as large as ¾-in. may be used. The mix for both kinds of concrete must be not less than one part of cement to 5¼ parts of total aggregates by volume and the ratio of fine to coarse aggregate must be between 50 and 67 percent. Mixing time must be at least three minutes. Deformed steel bars are used for reinforcing.

All the precast curbs manufactured in the Formigli plant are made under the supervision of an engineer from the New Jersey State Highway Department, who checks for workmanship, surface defects and discoloration in each piece. Each curb is matched with an approved advance sample kept at the plant, for whiteness, surface texture and finish.

Manufacturing Methods

All the curb are cast face down in non-porous concrete molds and vibrated on special tables fitted with pneumatic vibrators. Each mold is treated with stearic acid and then wiped down before each pour, to prevent sticking. White concrete is first placed and puddled and vibrated thoroughly to remove air bubbles and to fill all of the crevices of the mold and then the grey concrete is placed. Concrete is handled to the molds in wheelbarrows and shoveled into the molds, which are handled to and from the vibrating tables by an overhead chain hoist. The vibrating cycle takes three minutes and the capacity is 60 curb in 8 hr. of operation. The curb are kept covered and are wetted down for five days, with shipments made after a minimum of 14 days.

Stripping from the molds is done with the aid of compressed air. Each mold has a ¼-in. round hole through its shell near one end that is covered with a strip of paper when the concrete is placed. Air under 80 p.s.i.

(Continued on page 128)

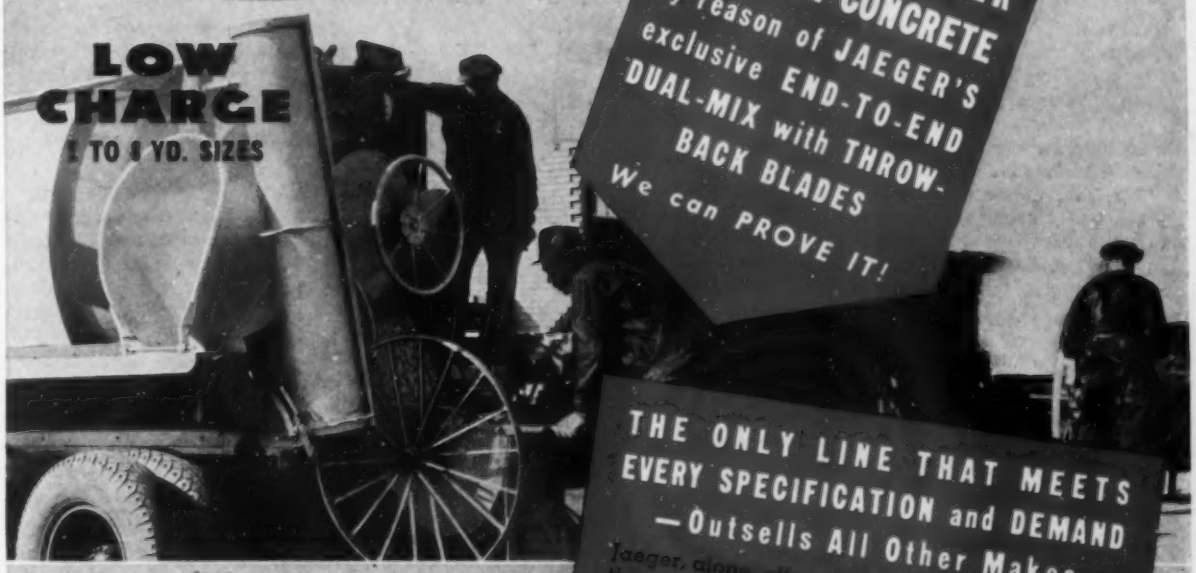
JAEGERS DO what others merely claim

CHARGE, MIX and DISCHARGE FASTER THAN ANY OTHER TRUCK MIXER—
We can PROVE IT!

HIGH DUMP
2 TO 5 YD. SIZES

PRODUCE HIGHER STRENGTH CONCRETE
by reason of JAEGER'S exclusive END-TO-END DUAL-MIX with THROW-BACK BLADES
We can PROVE IT!

LOW CHARGE
1 TO 8 YD. SIZES



THE ONLY LINE THAT MEETS EVERY SPECIFICATION and DEMAND
—Outsells All Other Makes

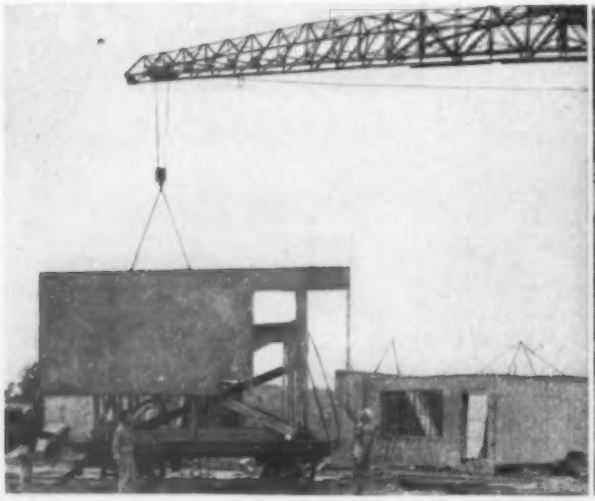
Jaeger, alone, offers maximum payload production of highest quality concrete in units with standard 2-Speed Transmission (Separate Engine or Vacuum-Controlled Truck Engine Drive), One-Shot Top Loading, Vacuum-Controlled High Discharge Door, End-to-End Water Sprays and Dual-Mixing in Sealed Drums. Also Combination Top or End Loaders for older or temporary plants not equipped for fast ribbon loading.

Send for complete catalog and prices — 2 to 8 Yd. sizes.

Combination Top or End Loader — to meet conditions. Only end loader that does not constrict drum opening or require moving Hopper to discharge.

Portable 2-3 Yd. Hopper: Eliminates waiting—averages 25% more payloads. Tows behind truck mixer.

THE JAEGER MACHINE COMPANY 603 DUBLIN AVENUE COLUMBUS, OHIO



Left: Wall slab of precast concrete in steel frame being loaded on trailer for transportation to job. Truck and trailer carry complete 24-ton house. Right: Special crane placing slabs into position

Incendiary - Proof Houses

Precast concrete slabs used in California to build houses for defense workers

By ANDREW R. BOONE

CONCRETE HOUSES are being built of precast concrete slabs poured within steel frames which are lifted by crane into a vertical position and bolted together by the Hayes Econo-Crete Corp., of Los Angeles, Calif. Hal B. Hayes, inventor of the process and head of the company, has received an award to build 1600 two-bedroom units by this method for national defense housing at Long Beach.

About 80,000 sq. ft. of concrete bases and steel forms will be laid in 10- x 20-ft. sections on a lot near the project. As the units are cured, they will be transported by truck and trailer to the building site.

Mr. Hayes has received a number of basic patents covering his designs, and others are applied for. Several features are unusual, though concrete buildings with entire walls set in place are not wholly new.

Key to the system is the novel crane. This device consists of a collapsible tower supported on a truck, to which is fixed a boom 50 ft. long. Equipped with a 50-hp. gasoline engine, the hoist and cables can lift a four-ton load at the extreme end, or eight tons near the axis. The crane engine speed of 2000 r.p.m. is reduced through gears to 10 r.p.m. hoist speed. Since the heaviest wall section will weigh no more than five tons, the crane performs efficiently under nearly all working conditions.

These cranes are used on the fabricating lot, on the outskirts of Burbank, Calif., and also at the building site. When ready to lift a wall or roof section onto a waiting trailer, the crane picks up the load easily and moves it out to the desired position. Side jacks support the truck and tower, guaranteeing rigidity to the operating mechanism. Wall sections measuring 15- x 25-ft. are easily handled.

Demonstrating fire-resisting quality of concrete, having pumice in mix, with a welding torch

Use Pumice for Lightness and Strength

Mr. Hayes has worked out his own formulas for certain structural sections. Those exposed to outside temperatures contain aggregates comprising 50 percent pumice, obtained by Diesel truck from the Mojave desert, and 50 percent rock and sand, hauled in by dump trucks from nearby Roscoe, Calif. "Other light weight aggregates could be used to replace the pumice," says Mr. Hayes. "Light weight burned aggregates would give greater strength, though less insulation."

Interior walls are of standard mix, using small ¾-in. rock; 3½ parts rock, 2½ parts concrete sand, one part cement. To obtain a quick set, Mr. Hayes incorporates 2 percent of calcium chloride with the cement. One part of cement to six parts of rock and pumice is used in the outside walls.

Before starting a house or a series of houses, the form way is prepared. This consists of hard aggregate concrete mix, surfaced by steel trowels to a fine finish. Forty-eight hours later, each section is treated with a mixture of paraffin, oil and wax. Sprayed on, this mixture penetrates the surface and breaks the bond be-

CEMENT DISPERSION *Guarantees* SAVINGS *with* DURABILITY

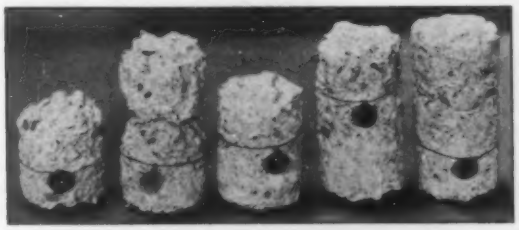
TAYLORCRAFT AVIATION CORP., ALLIANCE, OHIO.
Architect — Albert Kahn, Inc., Detroit, Michigan.
General Contractor — F. H. Martin Construction Co., Detroit, Michigan.

Through CEMENT DISPERSION the efficiency of all cement is measurably increased. This is a fact of great importance to all concrete construction because—increase in efficiency means **savings in initial cost.** This fact is now testified to by savings made on scores of projects, large and small.

Further — long range economy is assured through added durability which Cement Dispersion imparts.

SPEND LESS AND GET MORE

The unit cost of the concrete in these Pozzolith specimens is substantially lower than that of the plain, yet startlingly better concrete is achieved.



POZZOLITH CONCRETE (*Dispersed*)

After 150 cycles of freezing and thawing *loss by weight only 3½%*. Plasticizing effect of Cement Dispersion permitted 20% more aggregate.

PLAIN CONCRETE (*Undispersed*)

Same materials as above but 20% less aggregate (15% richer), made to same consistency, *loss 73% by weight* after 150 cycles. Disintegration far advanced.

Tests made at leading University.

HOW CEMENT DISPERSION WORKS

Only a part of the cementitious value of the cement, whether normal portland or high early, is utilized under usual construction conditions. Investigation shows that with 28 days curing only 50% hydrates. [Anderegg and Hubbell, A. S. T. M. 29 II 554 (1929)].

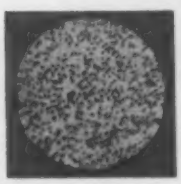
Dispersed cement produces 25% to 40% higher compressive strengths.

WITHOUT POZZOLITH

Cement particles in their normal state in water tend to gather in bunches; i.e., flocculate. Water never reaches some particles and many are only partly hydrated. This reduces the effectiveness of the cement, entraps water within the clumps, requires an excess of water for placement and often results in bleeding and segregation. See photomicrograph at right.

Cement suspended in water
UNDISPERSED

WITH POZZOLITH



Cement suspended in water
DISPERSED

With Pozzolith the dispersion principle operates to drive each particle apart, thus exposing all the cement particles to the vital hydrating action. See photomicrograph at left.

This dispersion makes the cement usable to its maximum efficiency since all the water is made available for lubrication of the mix and the entire surface area is exposed for hydration.

Send for Research Paper No. 36 "Economics of Cement Dispersion" and Complete facts on Pozzolith

THE MASTER BUILDERS CO.
CLEVELAND, OHIO **TORONTO, CANADA**

MASTER BUILDERS

First house constructed of precast concrete slabs in North Hollywood, Calif.

tween the base and the freshly poured slab.

When the bases are ready, steel forms are laid in place. These are complete, including doors and windows. Pouring takes place progressively in an assembly line technique. On small jobs, concrete may be delivered by a transit mixer truck. From five to 10 minutes after pouring, workmen start vibrating the mix, using a flexible hose type vibrator.

Each 8- x 10-ft. section is vibrated for a period of 10 minutes. This treatment usually removes entrapped air in the concrete, and Mr. Hayes has found a 10-minute vibration adequate.

The method from start to finish is simple, involving no complicated steps beyond the original design and construction of the first crane. Many experiments have been made to determine the proper thickness of walls and roof. For the forthcoming defense houses, three-inch floors will be laid with 2½-in. solid inner walls, 10-in. double outer walls, and the structures will have 3-in. roofs.

Floors consist of flat slabs laid over an air space six inches or more in thickness. These slabs are reinforced with ⅜-in. bars, 8-in. centers. Walls are reinforced with No. 8 galvanized wire, 4-in. on center. Outer and inner walls are alike, except that the two 2½-in. sections for the outer walls are separated by a 5-in. air space.

Roofs Resist Incendiary Bombs

Of particular interest is the roof. Tests show this slab is strong enough to stop a 2½-lb. incendiary bomb, even when hit directly. When pumice is used in the mix, the roof withstands the heat of thermite very well, merely glazing over and not opening a crater through which the incendiary might drop. As for general strength of roof and walls, either mix will stop flying fragments from high explosive shells and shrapnel. It is not claimed that these structures will be safe against direct hits from bombs or projectiles.

The success of the floor construction is based upon each section setting level. Sections are poured. Ten minutes later the forms are stripped. One hour after stripping, mortar is poured; when it begins to take its initial set, the mortar is gone over with a screed and leveled on straight edges. Thus a level floor is attained.

Speed of construction depends upon the number of units to be built. Mr. Hayes estimates that with standard plans, he can pour a two-bedroom house Monday and have it erected ready for occupancy by Thursday. Sink, drain and splash boards are cast in a single piece. Electrical conduits are cast within the walls.

Recently an exhibition of this construction was given for a group of naval officers. In 27 minutes walls and roof for a two-bedroom house were poured. Some days later, for defense authorities, the job was done in 22 minutes. How rapidly these homes can be put up in lots of 1600 remains to be seen. By extending the slabs and adding batchers, Hayes is sure he can build 50 houses a day. All he needs are steel men to lay the reinforcing, concrete men to handle the mix, truck crews to lift the parts and transport them to the nearby building site (10 cranes are to be used on the Long Beach job), and mechanics to bolt them together.

A "two-bedroomer" represents approximately 20 sections weighing 24 tons. In one test, such a home was taken from the trailer, landed on the foundation, and bolted together in 90 minutes.

Spraying mixture of paraffin, oil and wax on form-way, preparatory to pouring slab

Ready Mix Expansion In New York

Ryan Ready Mixed Concrete Co. has leased from the Baker estate a parcel of vacant land located on Newtown Creek, Brooklyn, comprising 25,000 sq. ft. of space. Upon completion of improvements, the property will be used as a batching plant and "for the manufacture of building materials."

Building Garage

Tyler Cement Tile and Silo Works, Tyler, Minn., is building a new garage as part of its expansion program. Jens Jaspersen founded the business about 30 years ago, and is now assisted by his sons. Drainage tile is one of the products in greatest demand.

New Block Plants

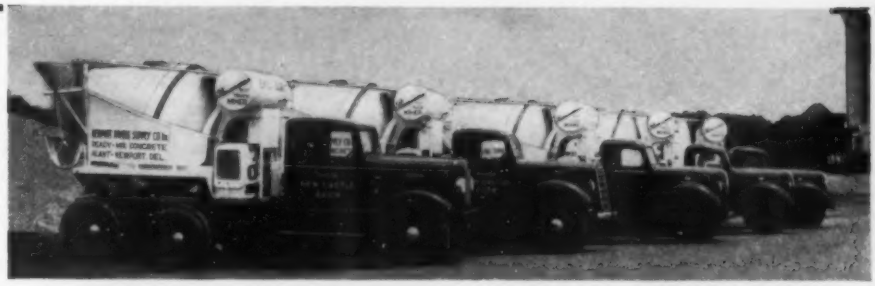
Building Products Co., subsidiary of Schwartz Lumber Co., Elkville, Ill., plans to start operations in its new concrete block manufacturing plant early in January, 1942. The new plant will have two steam drying kilns, 12- x 30-ft., and a room 30- x 32-ft. for the block machine and the bins.

•

Bellevue, Nebr., has a new concrete block and brick manufacturing concern which has built a new plant. Colored brick will be a specialty with this company. The plant is being operated by Mr. Humaderer who was formerly located in St. Joseph, Mo. Ready mixed concrete will also be sold.

Building Concrete Barges

San Jacinto Shipbuilders, Inc., Houston, Texas, has started construction on the $3,285,000 barge plant at Highlands, Texas. Approximately $30,000 worth of shops, buildings and three ways will be included in the preliminary construction. This company has a contract with the federal government for construction of five concrete barges, each of which is to be 350 ft. long and 30 ft. deep with a 54-ft. beam.



Ransome Truck Mixers

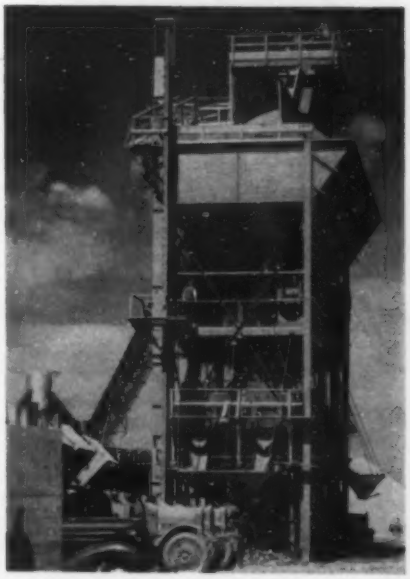
Horizontal and "HI-UP" types, bring you features found in no other mixer. Visit our booth at the Ready-Mixed Show

Booths 64-65 National Ready-Mixed Concrete Exposition — Cincinnati, Jan. 28, 29, 30, 1942

RANSOME CONCRETE MACHINERY COMPANY DUNELLEN, NEW JERSEY

SPEED—

Now, More Than Ever, It Is Essential as America Goes Into Action



This plant produced 2800 cu. yds. of concrete per day for the Chicago Filtration Plant. Similar plants will produce up to 420 yds. per hour in drydock construction.

This highly efficient ready-mix concrete plant batches cement automatically. Note truck delivering bulk cement.

Now, more than ever, the construction industry is called upon for an unparalleled effort. Now, more than ever, builders are turning to Butler equipment to speed the program. Whether your requirements are for a concrete plant, transit plant, sand and gravel plant, concrete block plant, bulk cement plant, or batching bin, consult Butler engineers today. Time is precious; let Butler save it for you where it counts.

BUTLER BIN COMPANY

WAUKESHA **WISCONSIN**

Production machine for the manufacture of joists in the plant of Formigli Architectural Stone Co. These joists, rolled under pressure and well reinforced, are sold principally for large structures

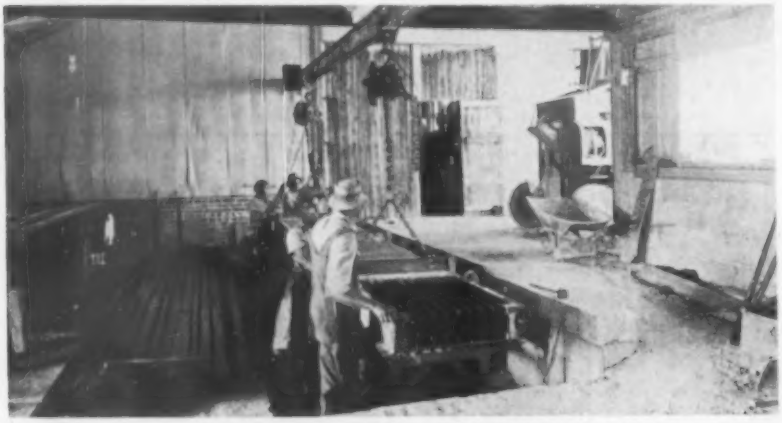
A Production Record

(Continued from page 119)

to furnish these structural tie members. Scarcity of steel is opening the way for more activity in this development.

The Lith-I-bar joists are of prerolled structural concrete with the concrete encasing a rigidly welded framework of reinforcing steel designed to standard factors of safety. The joist is machine-rolled under pressure, in depths from 6 to 14 in. and up to 34 ft. in length with an I-beam cross-section.

A carriage carrying an oiled pallet travels under a concrete feed hopper, receiving a loose bed of concrete between guide rails. The reinforcing steel unit is then placed and the rest of the concrete is poured over the steel and a series of rollers press the concrete to dimensions on the return travel of the carriage under the feed hopper.



Handling concrete joists in a gang mold by overhead chain hoist in the plant of Hoke Concrete Works, Raeford, N. C. These joists are sold for installation with Stonex colored tile, spaced on 24-in. centers

Special cart used by Midwest Concrete Pipe Co. to place "Flexicore" floor slabs in position. Upwards of 1,000,000 sq. ft. of this system of floor slab construction were placed in 1941

Wailes-Bageman Co., Los Angeles, Calif., has finished a contract for precast concrete floor joists and beams that is said to have saved 25 percent from the estimated cost of construction of a two-story 175- x 550-ft. warehouse for the Navy Department at San Pedro, Calif. About 1600 prefabricated reinforced concrete members providing for support of a 93,500 sq. ft. floor area were incorporated in the second-floor framing of the building.

The units were manufactured at a nearby yard, in two types, ranging from 18 ft. 3 in. to 22 ft. in length. Floor joists were 4- x 12-in., weighing up to 750 lb. and 12- x 16-in. strut beams weighed up to 5300 lb. each. Concrete was poured into metal forms from ready-mixed concrete trucks and vibrated into place, using a 1:3½ mix with sand and granite rock aggregates. The water cement ratio was only 3.3 gal. per sack of cement. During vibration, pressure was applied to the sides of the form assembly by hydraulic jacks and the resultant concrete was so dense as to weigh up to 155 lb. per cu. ft. Stripping was done as soon as vibration was completed. After a total of 16 hr., the units were stored to await transfer to the job site.

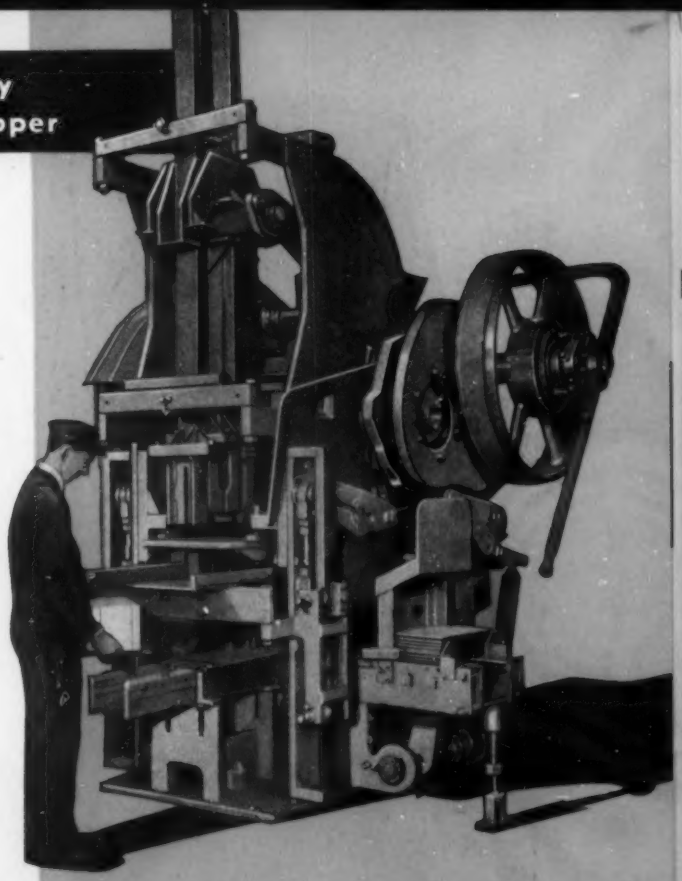
Casting Curbing

(Continued from page 122)

pressure is introduced through an airline into the hole, breaking the paper seal and "shocking" the mold from the concrete.

A close checkup is made on all types of defects as well as whiteness, etc. No more than two percent of the top surface area on a single piece is allowed to be defective, as measured by counting air holes. An air hole is defined as a hole bigger than ⅛-in. across or deep. Thirty of these holes are the maximum allowed per lineal foot. The sum of the lengths of discoloration caused by mold cracks cannot exceed 50 percent of the length of the curb, while the maximum length of a single line of discoloration cannot exceed 18-in. and at least 75 percent of the exposed area must be entirely free from lines of discoloration. Not more than five percent of the total length of the top corners of the reflecting faces in one piece may be broken or rounded. Very close tolerances are permitted on the dimensions.

Besser Victory
Plain Pallet Stripper



BESSER

PLAIN PALLET STRIPPERS

The Victory Tamper

Fully Automatic. Strong, simple construction.

All units made with Fully Pressed Top.

Capacity 4½ blocks (8x8x16) per minute.

Small units made in multiples on one plain pallet.

All movements actuated by cams driven by a slow revolving shaft.

Direct Motor Drive or Pulley for Flat Belt Drive.

All bearings fully protected. Alemite lubrication throughout.

Quick change attachments to make any size block, tile or brick.

May be equipped with Automatic Pallet Feeder and Automatic Front Conveyor.

Mixer and Loader can be furnished for mounting over machine or on floor level or on mezzanine floor above machine.

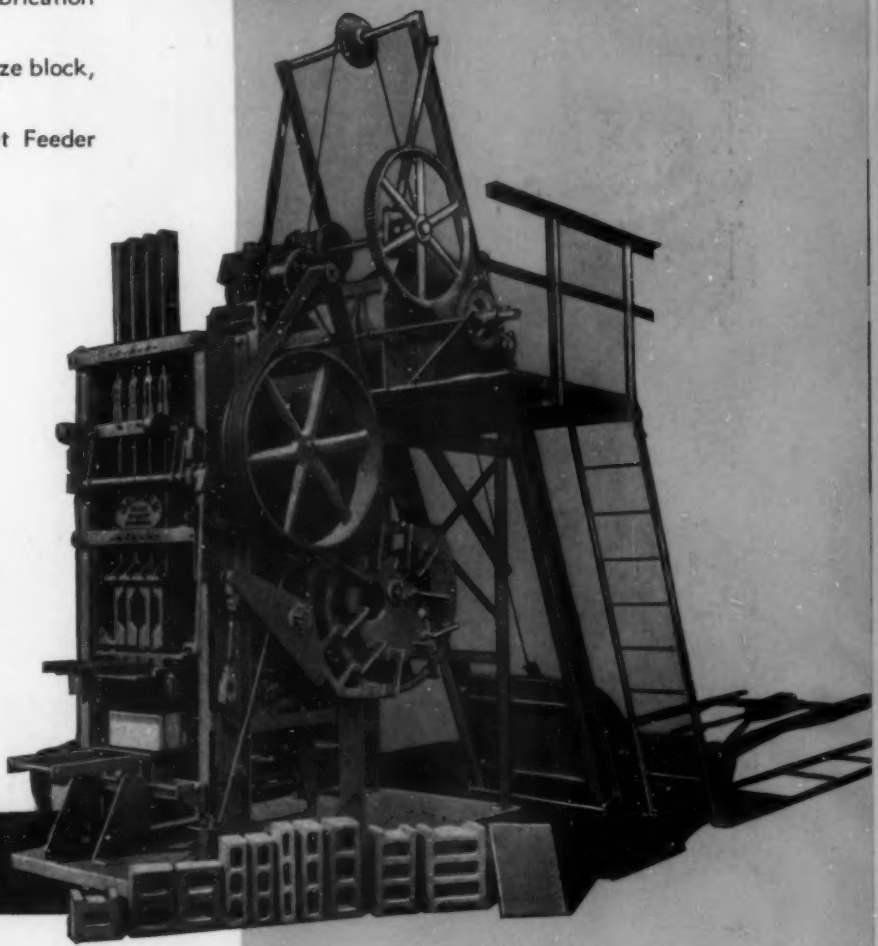
The Champion Tamper

All movements power operated and controlled by one hand lever and one foot pedal.

Capacity (depending on operator) up to 1000 or more per 8-hour day.

Mixer and Loader can be furnished for mounting over machine or on floor level or on mezzanine floor above machine.

All Sizes and Types of Units Made on One Set of Plain Wood or Steel Pallets.



Besser Champion
Plain Pallet Stripper

BESSER MANUFACTURING COMPANY 202 42ND STREET, ALPENA, MICHIGAN

COMPLETE EQUIPMENT FOR CONCRETE PRODUCTS PLANTS *Complete Sales and Service on BESSER, ANCHOR, CONSOLIDATED, IDEAL, HOBBS, UNIVERSAL, PORTLAND*

PLAIN PALLET FOR LARGER TAMPERS

THE SUPER UNITIZED

Illustration (above) shows the Besser Super Plain Pallet Stripper with Skip Loader and Mixer mounted over machine. Automatic Pallet Feeder and Automatic Front Conveyor. Other mixer mounting can be furnished if desired.

The Super Tamper

Highest production tamper machine made.

All units made with Fully Pressed Top.

Capacity 6½ blocks (8x8x16) per min.

Small units made in multiples on one plain pallet.

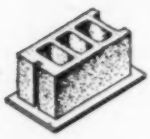
All movements actuated by cams driven by a slow revolving shaft.

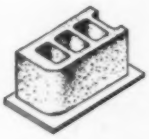
Direct Motor Drive or Pulley for Flat Belt Drive.

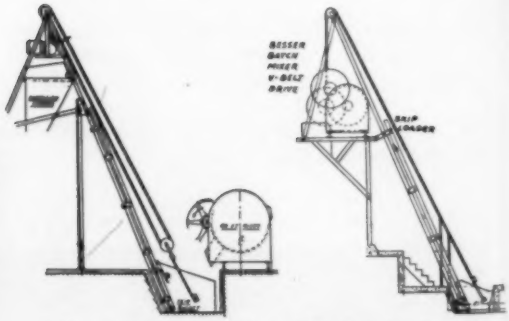
All bearings fully protected. Alemite lubrication throughout.

Quick change attachments to make any size block, tile or brick.

Automatic Pallet Feeder and Automatic Front Conveyor optional at small extra cost—greatly lowers production cost.





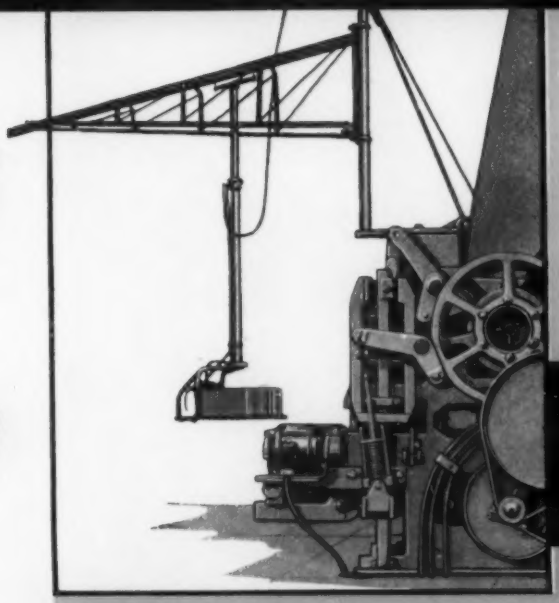


Mixer may be mounted on either floor level or above a Besser Tamper or Vibrapac

THE SAVING IN PALLET COST WILL PAY FOR A BESSER PLAIN PALLET STRIPPER

STRIPPERS

PRODUCTION VIBRATORS



Power offbearing hoist. One man offbears 600 blocks per hour—no *lifting*—simply *guide* the hoist.

The Super Vibrapac

Highest production block machine made.

Uses same mixing equipment with loader and optional mountings as supplied for tamping machines.

Capacity 600 blocks (8x8x16) per hour. Small units in multiples from 4 to 32 (brick) on one pallet.

Makes Fully Pressed Top Units.

Fully Automatic. Strong construction.

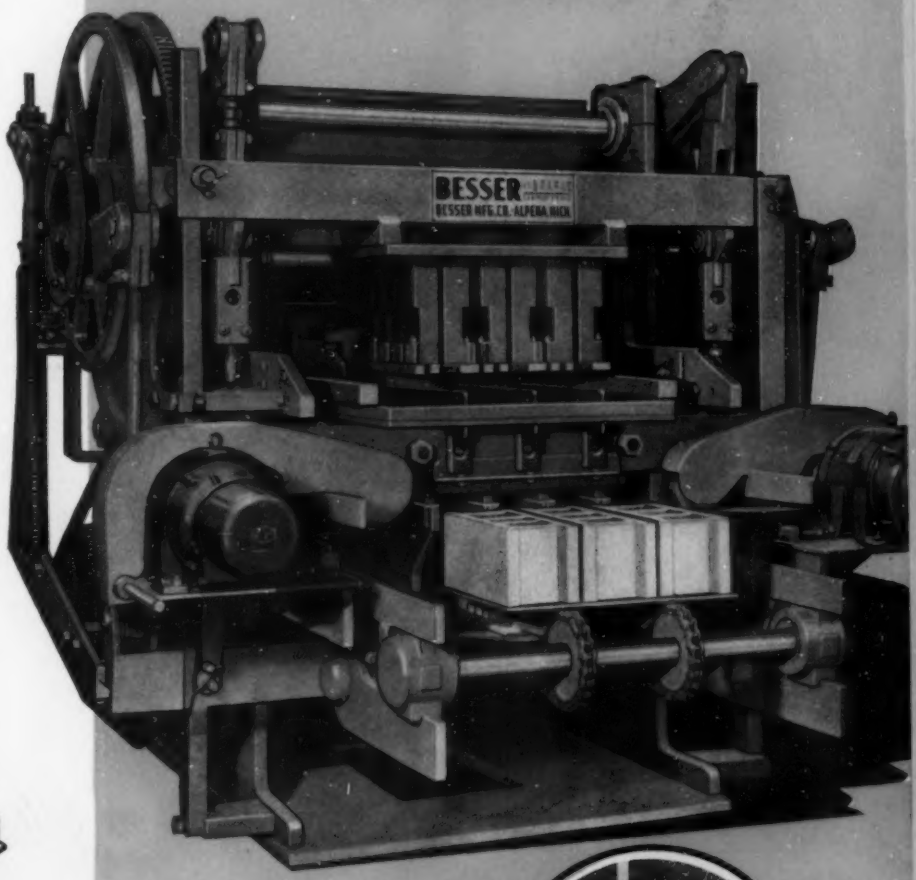
Mold insulated by rubber cushions keeps vibration from reaching any other parts of machine and eliminates shocks and strains.

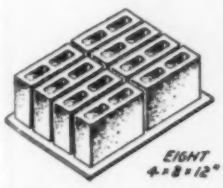
Pallets cleaned and oiled automatically.

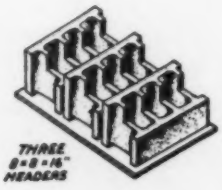
No machine operator. The Vibrapac sets the pace—no halting, no lagging.

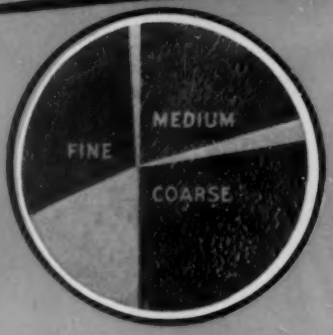
Power offbearing hoist. One man offbearer—no lifting.

Makes units of any Density or Texture desired.







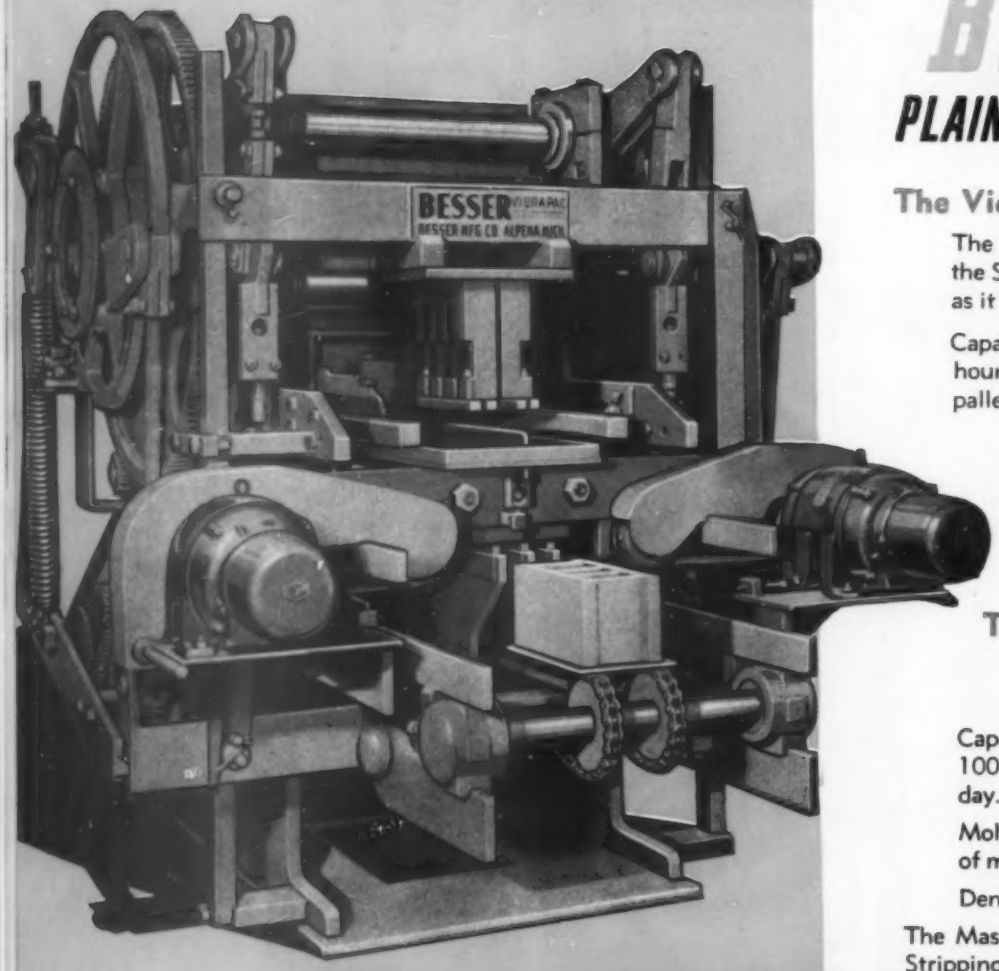


50% greater production. The Vibrapac makes 3 blocks (8"x8"x16") on one plain pallet at the rate of 600 per hour. Smaller units made in larger multiples on one plain pallet.

EVERY CONCRETE PRODUCTS PLANT NEEDS A BESSER PLAIN PALLET STRIPPER

BESSER

PLAIN PALLET STRIPPERS



The Victory Vibrapac

The Victory is constructed the same as the Super Vibrapac except narrower width as it makes one 8" or 12" block at a time.

Capacity 270 blocks (8"x 8"x 16") per hour. Small units in multiples on one pallet.

The Victory has all special features of the Super Vibrapac and differs only in size and capacity.

•

The Master Vibrapac

All operations except vibrating done by hand.

Capacity (depending on operator) up to 1000 blocks (8"x8"x16") per 8-hour day. Makes Fully Pressed Top Units.

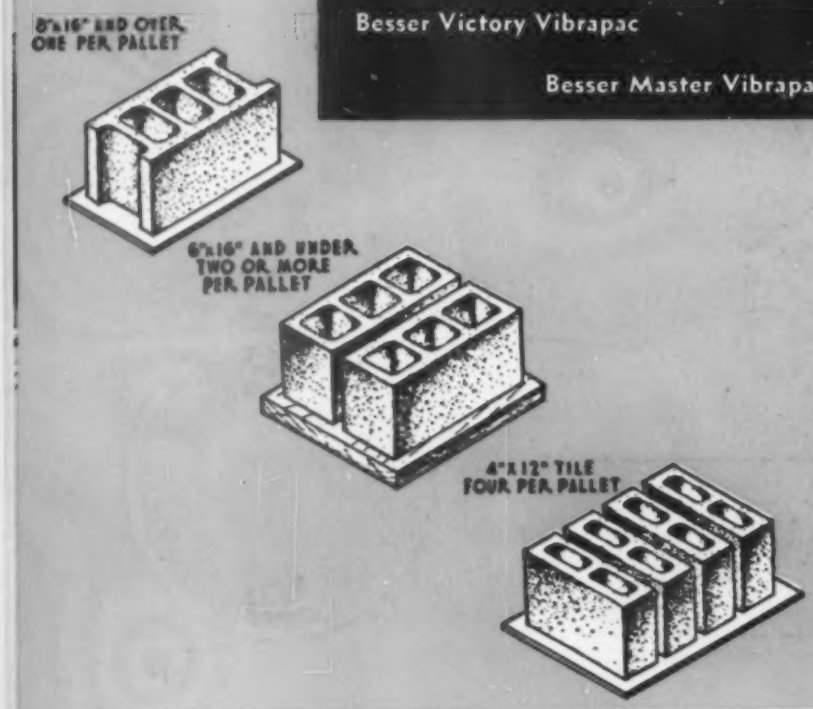
Mold insulated by rubber from other parts of machine.

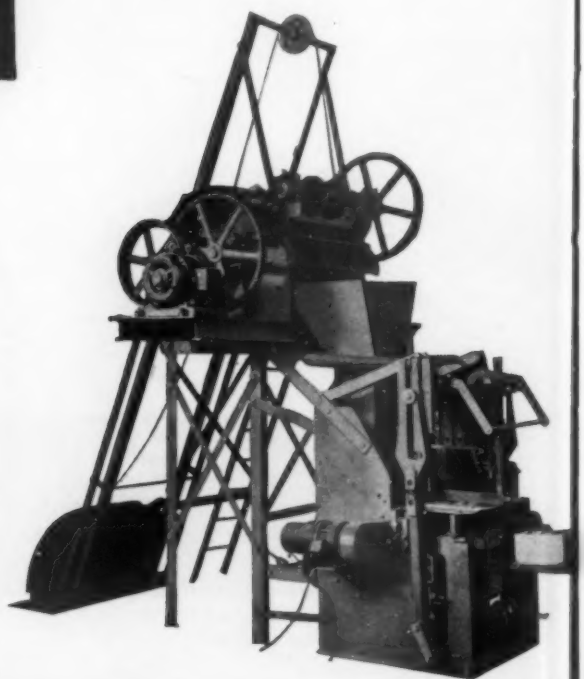
Density and Texture controlled.

The Master Vibrapac is furnished with Power Stripping and also with Power Stripping and Power Feeding at extra cost. Capacity increased.

Besser Victory Vibrapac

Besser Master Vibrapac





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From Mixer Truck to the Job By Detachable Conveyor

By RALPH BAKER

UNITED CONCRETE PIPE CORPORATION, Los Angeles, Calif., worked out an ingenious solution for a concrete pouring problem on their contract to line a section of the banks of the Los Angeles river.

In constructing the parapet walls at the top of the levee, concrete is brought in from the batching plant, about a mile away, in transit mixer trucks. These trucks have to travel along the levee top which is too narrow to permit passing, turning or even maneuvering for a dumping position.

To meet this situation, a special conveyor was designed that can be easily and quickly moved to any position when attached to the mixer truck. It consists of lattice steel boom-like frame upon which is mounted a belt conveyor and a gasoline motor to furnish the power. The gasoline motor is supported below the frame, and drives the belt through an ingenious system of pulleys and belts.

The complete assembly, which weighs only 1200 lb., is suspended on a hoist which hooks on either side of the conveyor frame to fittings located at the exact center of gravity so that the whole balances when swinging clear. So balanced, it can be swung to any desired position or the ends raised or lowered easily.

Upon the rear of each truck is a special fitting directly under the mouth of the mixer, and to this the conveyor is attached as soon as the truck arrives.

Eight minutes are required to handle the 4-cu. yd. batches, and when the mixer is empty, the conveyor is detached and again swung clear, ready for the next truck. Only one minute is needed to detach the conveyor, and another to attach it.

The empty trucks proceed down the levee and return to the batching plant over another road. Four 4-cu. yd. transit mixers are servicing this phase of the construction, and an average of 500 linear feet of wall, 6 ft. high, 8 in. thick at the top, and 28 in. thick at the base, are being poured daily.

Ready Mix for Defense

(Continued from page 117)

which will permit all-winter operation is the installation of a new 50-hp. boiler that will be stoker fired. Water for the mixer trucks will be heated to 150 deg. Steam pipes will maintain a temperature of 50 deg. in the aggregates as they are fed to the batcher.

All mixer trucks are equipped with counters as Michigan highway department specifications require a minimum of 50 revolutions before delivery of ready mixed concrete and a maximum of 150 revolutions.

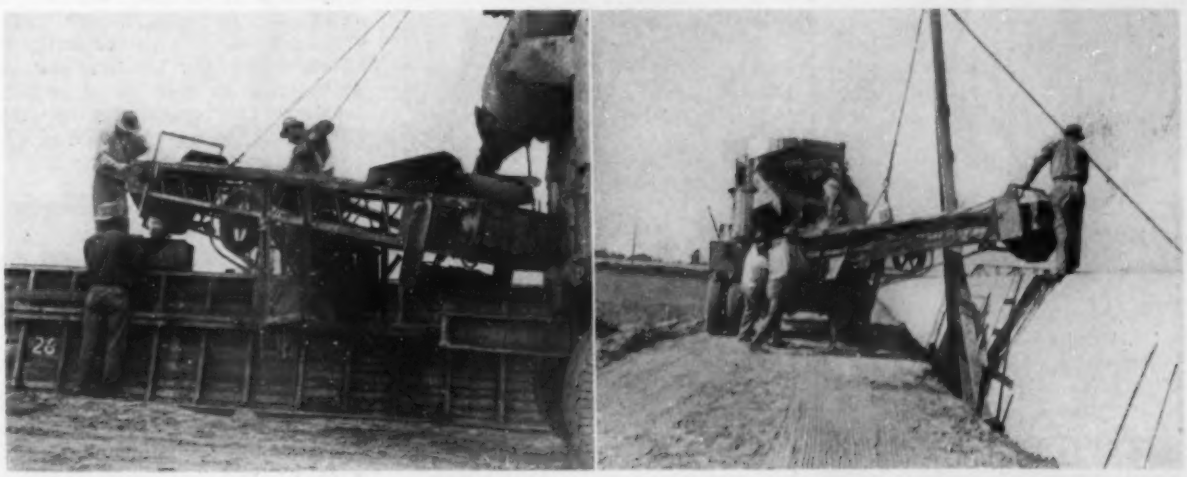
High Test Concrete

A close control is kept of all batching operations, water-cement ratio, etc., to maintain a high standard of strength. Cylinders of concrete tested in the Battle Creek city engineering laboratory for 4000-lb. concrete at 28 days have consistently shown an actual compressive strength of 5000 lb.

Some idea of the enthusiastic acceptance of ready mixed concrete may be obtained from the experience of one of the customer contractors. A grade separation over the Grand Trunk railroad right-of-way is now under construction, a link in the new highway from Fort Custer to the City of Battle Creek. This is a Michigan State Highway Department job which is being constructed by Walter Toebe of Munising, Mich. Mr. Toebe recognized the value of ready mixed concrete, and has contracted with the Battle Creek Gravel Co. to furnish concrete for this job. Mr. Toebe is three months ahead of his construction schedule; placing concrete now which was scheduled for March, 1942. Mr. Toebe, when questioned on December 6 said, "We are three months ahead of schedule on our contract because we could get our concrete when and in the quantities we needed through the use of ready mixed concrete, pouring as much as 128 cu. yd. of concrete in an 8-hour day, which is considered good on this type of work. The splendid cooperation of the Michigan State Highway Department's engineers has contributed greatly to this record."

Aggregates Obtained from Adjacent Plant

Ample stockpiles of aggregates are available for the ready mixed concrete plant from the sand and gravel plant of the Battle Creek Gravel Co. Production is about 800 cu. yd. in a 10-hour day. Stockpiles have been increased this year to take care of any demands for defense work and to provide a reserve when the sand and gravel plant will be shut down. Barber Greene and Haiss loaders are used in loading trucks from stockpiles.



Left: Mixer truck dumping concrete to belt of detachable conveyor for placing concrete into forms. Right: Method of supporting conveyor. Note hopper at the end of conveyor

"ANCHOR"

Complete

EQUIPMENT AND ENGINEERING SERVICE

Equipment for all phases of manufacturing concrete cinder block and other lightweight aggregate units. Our engineering service for new plants and modernizing old ones will help you operate more economically.

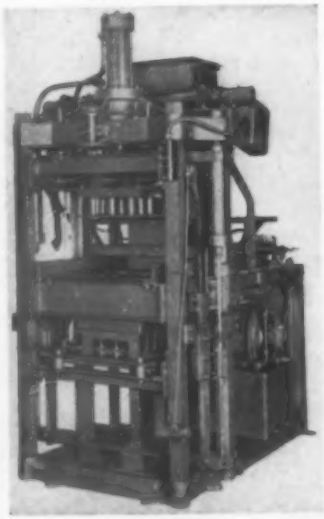
Hobbs block machines, Anchor tampers, Anchor Jr. strippers, Stearns power strippers, Stearns Joltcrete, Stearns mixers, pallets, Straubiox Oscillating attachments, etc.

Repair parts for Anchor, Ideal, Universal, Stearns, Blystone mixers and others.

Anchor Concrete Mchy. Co.

G. M. Friel, Mgr., COLUMBUS, OHIO

HYDRAULIC VIBRA-PRESS



A High Production Machine Making Blocks which are Demanded by the Contractor Endorsed by the Architect Desired by the Mason

The KENT MACHINE CO.

CUYAHOGA FALLS, OHIO

Set-up of pipe plant for a temporary defense job with forms arranged for mass production of 48-in. and 72-in. pipe. Use concrete from nearby ready mixed concrete plant

Use Ready Mixed Concrete To Make Large Pipe

A GOOD ILLUSTRATION of how mass production facilities may be adapted to meet an emergency condition is the set-up for manufacturing concrete pipe made by the Independent Concrete Pipe Corp., Inc., Indianapolis, Ind., at New Albany, Ind.

The company had a contract for about 1½ miles of 48-in. to 72-in. diameter reinforced concrete pipe for the Jeffersonville Quartermaster depot in adjoining Jeffersonville, Ind.

To fill this contract, advantage was taken of available property adjoining the New Albany Ready Mix Concrete, Inc., plant and the pipe were poured with ready-mixed concrete.

Steel forms were brought in from another of the company's plants, and Electric Tamper and Equipment Co. portable vibrators were fastened to the forms to place the concrete.

The molds were set up in a row, on a mass production plan, with workmen always in advance of the molds being poured, tying reinforcing and setting up molds ahead of the concrete operations.

A 1-in. slump concrete was used and the pipe were cured by covering them with tarpaulins and running steam lines into the barrel of each pipe from a 100-hp. steam boiler. From 30 to 40 local men were employed and as much as 80 cu. yd. of transit mixed concrete a day was poured.

Dumping ready mixed concrete into row of pipe forms. Note electric vibrators attached to forms. Below: Placing steel reinforcement

Concrete Barges

FIFTEEN concrete bulk cargo barges are now being built under contracts recently placed by the Maritime Commission. In keeping with the Commission's policy of distributing the work as much as possible, it was determined that five barges would be built on each of the coasts: Atlantic, Gulf, and Pacific.

General specifications for the barges are approximately 350 ft. in length and 54 ft. beam. They are to be equipped for operation with crews, although they will not be self-propelled. Delivery of all these craft is to be made in 1942. Total amount involved for construction of the barges and the required building facilities is approximately $9,000,000.

Add More Block Machines

STEARNS MANUFACTURING CO., Adrian, Mich., has announced that the following producers of concrete masonry units have installed a third Joltcrete machine: Cleveland Builders Supply Co., Cleveland, Ohio; Spickelmier Fuel & Supply Co., Indianapolis, Ind.; Cinder Block Co., Richmond, Va.; Hudson Supply & Equipment Co., Washington, D. C.; and Gray Concrete Pipe Co., Thomasville, N. C., and Hagerstown, Md.

"Here's a Hot One"

No one ever bought Commercial Pallets the second time—unless he had orders for more blocks than he could handle on the Commercial Pallets he already was using. The reason they do not buy them the second time is because they do not need to. The original purchase of steel, Close-Clearance Pallets lasts a life-time. You do not lose them by breakage, bending, cracking, warping, or any of the many other things that happen to wood, cast-iron or malleable pallets; and besides that they are all cored, easy to handle and light in weight.

Buy and be convinced of these facts

The COMMERCIAL SHEARING & STAMPING COMPANY
YOUNGSTOWN, OHIO.

THE TRANSPORT MIXER

COMPARE YOUR COSTS WITH THESE!
Less than 4 cents per cubic yard for maintenance and repair. Total truck mixer investment could be charged off now at 26 cents per cubic yard by this supplier of concrete to one of the nation's largest ordnance plants.

CONCRETE TRANSPORT MIXER CO., INC.
630 Rosedale Ave. St. Louis, Mo.

SURE CONCRETE BRICK CAN BE MADE WITHOUT PALLETS ON THE JACKSON CONCRETE BRICK MACHINE

Just Think What This Means in Dollars and cents saved in handling and upkeep as well as the cost of the pallets themselves.

Investigate today the most efficient and up to date concrete brick making equipment on the market.

JACKSON & CHURCH CO.
SAGINAW, MICH.

NEW LOW COSTS! in Block Production

Nothing equals the combined VIBRATION and PACKING of

PAK-CRETE

Write TODAY for illustrated folder, details, prices. Compare for yourself.

KRAMER PRODUCTS CO.
Industrial Street Peoria, Illinois

The "Quinn Standard"

FOR CONCRETE PIPE

The Quinn Standard is known as the best the world over, wherever concrete pipe is produced and used. Backed by over 30 years service in the hands of hundreds of Quinn-educated contractors, municipal departments and pipe manufacturers who know from experience that **Quinn pipe forms** and **Quinn mixing formulas** combine to produce the finest concrete pipe at lowest cost.

Quinn Heavy Duty Pipe Forms

Hand or wet process. Built to give more years of service—sizes for any diameter pipe from 12 to 84 inches—tongue and groove or bell end pipe—any length.

Quinn Medium Duty Pipe Forms

For making pipe 12 to 60 inches in diameter—any length.

WRITE TODAY
Complete information, prices and estimates sent on request.

QUINN WIRE & IRON WORKS 1640 12th ST. BOONE, IA

Read Now . . . How You Can

MAKE CONCRETE BRICK BETTER . . . AT LOW COST

with the

LITTLE DAVE BRICKMAKER

Many in the concrete field and many entering it will tell you Little Dave is a giant but *low-cost* producer using little floor space and simply operated. *Read from bulletin R-42 how this $97.50 (complete) machine can boost your profits.* Write for your free copy now!

R. F. REED CO. THREE RIVERS, MICH.

Start Up Quarry

EL DORADO MATERIALS CO., has opened up a quarry 1½ miles west of Towanda, Kans. The equipment comprises a primary crusher, a secondary crusher, and a roll crusher, each of which is driven by either Diesel or gasoline engines. Excavating and stripping equipment includes a gasoline-engine powered shovel, bulldozer, and a fleet of five trucks which also will be used to haul finished products. A spur track connecting with the Missouri Pacific railroad has been built for carload shipments. George Myers, secretary-treasurer and general manager of El Dorado Materials Co. reports that the eventual capacity will be 1600 tons daily.

New Cement Plant Laboratory

NEBRASKA CEMENT CO., Superior, Nebr., is now completing a new, modern laboratory. The new laboratory, which is 24- x 36-ft., is of concrete construction, and will be arranged and equipped in accordance with the latest developments in cement plant laboratories. This new laboratory replaces an old frame structure. W. W. Kistler is chief chemist at this plant.

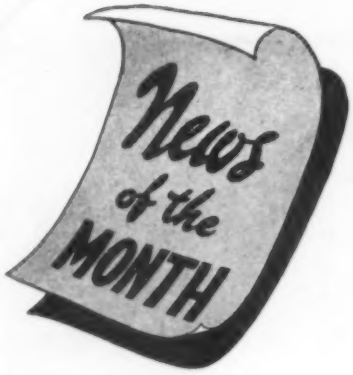
Another improvement under way is the repairing and reroofing of all of the large concrete silos. The silos will be resurfaced with a coat of white cement.

Open New Quarry for Defense Job

CUMBERLAND QUARRIES, INC., Indianapolis, Ind., has been organized by Norman Kelb and associates to produce the stone and stone sand required in the construction of Wolf Creek dam in southern Kentucky. Bids were received for this dam last July and S. A. Healy Co., Chicago, Ill., was low on a bid of $15,800,000. The contract for stone is with the S. A. Healy Co.

This project requires about 1,250,000 cu. yd. of mass concrete. The mass concrete with the additional aggregate used in connection with the dam will require a total of about 2,250,000 tons, including stone sand. Production of stone will start not later than June 1, 1942, and the contract will be completed in the early Fall of 1944. Shortage of power may require completion of the contract at an earlier date.

The stone plant has been designed for 350 to 400 tons per hour, and it is expected the operation will be on a basis of two shifts per day. Current plans call for the production of 750,000 tons of stone and sand in 1942; 1,150,000 tons in 1943 with the balance to be furnished in 1944.



From the aggregate producers viewpoint, a matter of particular interest is the large amount of stone sand which will be produced. This construction will require somewhere between 650,000 and 750,000 tons of sand. Aggregate requirements are very similar to those for the Cherokee Dam, which was described in the December, 1941, issue of ROCK PRODUCTS. Stone for Wolf Creek dam will be quarried 12 miles away. The quarry will have about a 110-ft. face, and it is planned to have a primary crusher and one tailing crusher at the quarry, reducing the sizes to 6-in. minus. A 15,000-ton surge pile will be carried at the quarry. The 6-in. minus will be trucked from the quarry to the screening plant, which will be located adjacent to the contractor's mixing plant at the side of the dam. At that point the material will go to finished storage from which it will be reclaimed by a tunnel conveyor system.

Open Rock Wool Plant

WEATHER MASTER ROCK WOOL CO., is the name of a new rock wool plant which recently started operations in St. Joseph, Mo. The company, which was formed under the guiding hand of the St. Joseph Plan, Inc., has a sales force organized and a back-log of orders for one-month's operations has been built up. The company has been financed with local capital. It will be operated by W. C. Thomas, president, who has had considerable rock wool manufacturing experience. A local quarry will furnish the stone.

Building Large Gravel Plant

RED RIVER GRAVEL CO., a Texas concern, has purchased 200 acres of gravel deposit land and is building a sand and gravel plant on the Kansas City Southern railroad two miles north of De Queen, Ark. A 4000-ft. railroad siding will be built. Capacity will be 75 cars of building gravel daily, under the management of C. L. Null.

Dow Magnesium Builds Texas Plant

THE DOW MAGNESIUM CORP., subsidiary of the Dow Chemical Co., has been incorporated in Delaware to build and operate under lease agreement with the Defense Plant Corporation a magnesium metal plant near Velasco, Tex. The cost is estimated at $50,000,000, and the production will be 72,000,000 lb. of magnesium annually.

Cement Plant Plans Extensive Building

UNIVERSAL ATLAS CEMENT CO., New York, N. Y., is planning the installation of new kilns, waste heat boilers and the construction of a tall stack with a Cottrell electrical precipitator at its Hudson, N. Y., plant, according to the *Hudson Star*. The building program will be delayed, however, because of the impossibility of getting materials at this time. The plant has been the center of a controversy because of alleged dusty conditions.

Silica Processing

THE LANTERN HILL SILICA CO., North Stonington, Conn., is operating a small test plant designed to separate impurities from a fine-grained silica sand. The deposit is peculiar in that the quartz grains are surrounded by films of extremely fine-grained muscovite mica carrying iron oxide. The Bureau of Mines has worked out a process whereby the mica and iron may be removed by froth flotation and agglomeration, and an effort is now being made to commercialize the process. (Oliver Bowles, Bureau of Mines.)

Mysterious Explosion

BROWNTOWN SILICA CO., Browntown, Wis., was recently damaged to the extent of $150,000 by fire which followed a mysterious explosion. The offices and main processing equipment were housed in the building destroyed. P. W. Palmer, one of the owners of the plant, notified the F.B.I. that sabotage was suspected since he knew of nothing in the plant that could explode. Silica was being produced for steel plants for use on defense contracts.

Big Quarry Blast

ABOUT 46,000 cu. yd. of stone was brought down in a blast recently fired at the quarry opened up two miles above the Norfolk damsite near Mountain Home, Ark. Twenty-one tons of powder were used. The rock is hauled to the aggregates plant at the site of the dam where it is crushed in sizes varying from a top of 6 in. to 1½ in.

Only 8 of 17 Points for:

HAZARD LAY-SET *Preformed*

PREFORMED WIRE ROPE

4. The load on a PREFORMED wire rope is distributed equally to each strand, and to each wire in every strand. The rope is safer under load, lasts longer and maintains the safety factor better.
5. When outer wires break they do not stand up from the surface of the rope to injure workmen, sheaves and the rope itself.
6. PREFORMED wire ropes are installed with greater ease and in shorter time.
7. PREFORMED wire ropes are "pre-broken-in."
8. PREFORMED wire ropes, in stretching, do not suffer change in length of lay. Strands are merely bedded firmly to the core.
9. PREFORMED wire ropes do not rotate in the sheaves to the same extent as non-preformed ropes.
10. PREFORMED wire ropes resist the whipping associated with vibration.
11. PREFORMED wire ropes permit more "fool proof" attachment of sockets, helping workmen to attach the sockets without unbalancing the rope lays below the socket bases.

Worn PREFORMED wire rope is safer to handle — does not "porcupine" — men handle it faster

PAGE 87

This is a page reproduced from the MODERN WIRE ROPE DIGEST *—America's No. 1 authority on wire rope, its manufacture, construction, care and use. It lists 17 points of superiority for the preformed type of wire rope.*

● Being preformed (and the *first* rope to be preformed under the assigned patents) Hazard LAY-SET has repeatedly proved up on all seventeen points in practically all applications. LAY-SET PREFORMED is backed by 96 years of rope-making experience and by a company that has clung so tenaciously to quality materials, manufacture and service that it has on its books many firms who have used Hazard ropes continuously for 40, 50 and 60 years. All Hazard ropes identified by the Green Strand are made of Improved Plow Steel.

HAZARD WIRE ROPE DIVISION
WILKES-BARRE, PENNSYLVANIA

AMERICAN CHAIN & CABLE COMPANY, INC., BRIDGEPORT, CONN.
District Offices: New York, Chicago, Philadelphia, Pittsburgh, Fort Worth, San Francisco, Denver, Los Angeles, Atlanta, Tacoma

GREEN SIGNIFIES SAFETY

HAZARD LAY-SET *Preformed* WIRE ROPE

FINANCIAL NOTES

RECENT DIVIDENDS ANNOUNCED

Alberene Stone Corp. of Va., Com. (p5)	$0.05 ext.	Dec. 24
Alpha Portland Cement Co., Com. (np)	1.25	Dec. 20
American Potash & Chem. Co., Cap. (np)	1.50	Dec. 16
Arundel Corp.	.25	Dec. 27
Arundel Corp., Com. (np)	.50 ext.	Dec. 27
Basic Refractories, Inc.	.20	Dec. 15
Blue Diamond Corp., Cap.	.10	Dec. 20
Cleveland Builders Supply Co., Com. (np)	1.00 ext.	Dec. 23
Coplay Cement Mfg. Co., 6% pfd. (p100)	5.00	Dec. 24
Diamond Portland Cement Co., Com. (pl)	.40	Dec. 20
Eastern Magnesia Talc Co., Com (p100)	2.00 ext.	Dec. 20
Ideal Cement Co., Com.	.35 Q	Dec. 22
Ideal Cement Co., Com. (p10)	.35 ext.	Dec. 22
Kelley Island Lime & Trans.	.25	Dec. 31
Lehigh Portland Cem. pf.	1.00	Jan. 2
Lone Star Cement Corp., Com. (np)	1.00 ext.	Dec. 23
Lone Star Cement Corp., Com. (np)	.75 Q	Dec. 23
Material Service Co.	1.00	Dec. 23
Medusa Portland Cement Co., Com (np)	.75	Dec. 23
Missouri Portland Cement Co., Com. (p25)	1.00	Dec. 15
Monolith Portland Midwest Co., 8% pfd. (p10) (arrears)	.30	Dec. 15
National Gypsum Co., Com.	.40	Dec. 20
Northwestern States Port. Cem. Co.	.40	Dec. 24
Pacific Coast Aggregates, Inc., Cap.	.05	Dec. 15
Pacific Portland Cement Co., pfd.	1.00	Dec. 26
Pennsylvania Glass Sand Corp., Com. div.	.25 Q	Jan. 1
Pennsylvania Glass Sand Corp., pfd.	1.25 Q	Jan. 1
Pennsylvania Glass Sand Corp., Com. (np)	.25 ext.	Dec. 12
Pennsylvania Sand Corp.	.25	Dec. 12
Pennsylvania Sand Corp.	.25 Q	Jan. 1
*Riverside Cement Co. Class A	.25	Dec. 31
Superior Portland Cement, Inc., $3.30 part. Class A	.82½	Dec. 24
Wolverine Portland Cem. Co., Com. (p10)	.20	Dec. 23

*First since 1937.

SCREENING FACTS

Not Just Claims

PRODUCERS of aggregate materials, whether operating one small plant or fifteen large ones, all agree that their screening equipment is the heart of their plant and to produce profits, must function efficiently. Simplicity Gyrating Screens do fulfill this requirement. The best proof of this fact is that over 1300 operating plants, each having from one to forty-six Simplicity machines, are on our list of known users.

One large producer, operating 15 plants in five different states, purchased their first Simplicity screens in 1929, and up to December 1st, 1941, has purchased a total of 104 Simplicity Gyrating Screens. Twenty-two of these units were purchased during 1941, with the bulk of them going into two of their newest and largest plants. Their purchases have ranged from 2′ x 3′ singles to 5′ x 12′ triples. During twelve years of operating Simplicity screens under all conditions, their records show a remarkably low average yearly maintenance cost per machine.

For Screening Facts, ask your Simplicity Representative, or see us at Booth No. 31, Sand & Gravel and Crushed Stone Shows.

SIMPLICITY ENGINEERING COMPANY

Durand, Michigan

LONGHORN PORTLAND CEMENT CO., San Antonio, Tex., had a net profit of $544,548 for the nine months ended September 30, 1941. The balance sheet is given below as of:

Assets:	Sept.30,'41	Dec.31,'40
Cash	$ 700,277	$ 485,733
Receivables, net	260,789	143,594
Inventories	180,386	147,626
Total current	$1,141,452	$ 776,953
Land, bldgs., etc.	3,721,669	3,706,263
Depreciation	1,380,458	1,275,320
Net property	2,341,211	2,430,943
Other assets	57,601	41,259
Deferred charges	19,589	12,328
Total	$3,559,853	$3,261,483
Liabilities:		
Accounts payable	$ 69,405	$ 92,360
Div. declared	8,059	.....
Accr. tax., etc.	443,756	327,391
Total current	$ 521,219	$ 419,751
First ref. 3½s	185,000	270,000
Pfd. retire., res.	38,486	33,113
5% pfd. ($100)	537,244	537,260
[1]Common stock	1,247,900	1,247,900
Capital surplus	134,503	134,504
Earned surplus	895,501	618,954
Total	$3,559,853	$3,261,483
Net current assets	$ 620,233	$ 357,202

[1] 249,580 no par shares.

NORTH AMERICAN CEMENT CORPORATION, New York, N. Y., reported a net loss of $54,105 for the 12 months ended September 30, 1941, after charges but before allowance for a profit on bonds purchased. This compares with a net loss of $415,664 in the 12 months ended September 30, 1940.

PENNSYLVANIA GLASS SAND CORP., Lewistown, Penn., reports a net profit of $722,694 for the 12 months ended October 31, 1941, after depreciation, depletion, interest, provision of $468,800 for income taxes and reserve of $216,300 for excess profits taxes. For the year ended December 31, 1940, the company reported a net profit of $806,837.

NATIONAL GYPSUM CO., Buffalo, N. Y., reports that present indications are that the net income for 1941 will range between 90c and $1.00 a share on the common stock, as compared to a reported net income of $1,565,196, equal to $1.03 a share on the common stock, in 1940.

•

YOSEMITE PORTLAND CEMENT CORP., San Francisco, Calif., has extended the time for conversion of the old class A stock into preferred for three months, or until March 31, 1942. Directors also announced the declaration of a dividend of 10c a share on the preferred, payable December 24 to stock of record December 13, and a dividend of the same amount payable January 2, 1942 to stock of record December 22. The December 24 payment brings 1941 dividends to a total of 35c a share, against 25c last year. The issue is entitled to an annual rate of 40c a share in noncumulative dividends.

•

NATIONAL GYPSUM CO., Buffalo, N. Y., according to a Dow-Jones statement, will probably report sales of around $24,000,000 in 1941. In 1940 sales amounted to $16,509,915 and in 1939 sales totalled $13,021,871. The consolidated balance sheet is given below as of:

Assets:	Sept.30,'41	Dec.31,'40
Cash	$ 1,370,570	$ 1,414,036
Time deposits	110,101	50,172
U. S. tax notes	750,000	.....
Receivables, net	3,752,348	2,480,329
[1]Finished prod.	1,450,502	1,624,610
[1]Mat. & supplies	1,342,864	1,123,492
Total current	$ 8,776,386	$ 6,692,640
Gypsum & lime dep.	1,617,863	1,560,638
Plant & equipmt.	15,532,086	13,735,065
Construc. in proc.	127,544	205,590
Total	17,277,493	15,501,293
Depreciation	2,588,727	2,118,068
Depletion	185,037	158,261
Net property	14,503,729	13,224,964
Pats., etc., net	54,986	58,973
Idle real estate	186,197	188,080
Invest. in sub.	1,000	1,000
Other invest.	107,334	105,596
Due fr. employees	60,070	64,851
Sundry receiv.	119,097	67,317
Debt disc. & exp.	73,271	72,810
Deferred charges	514,577	419,401
Total	$24,396,647	$20,895,631
Liabilities:		
Accts. payable	$ 774,028	$ 662,539
Accruals	442,665	239,017
Income taxes	1,585,515	510,269
Debentures due	220,000	226,000
Mtge. note due	43,500	.....
Total current	$ 3,065,709	$ 1,637,824
Deb. 3s, 1955	5,664,000	5,774,000
3% mtge. notes	391,500	.....
Insurance res.	67,759	50,000
Conting. reserve	100,000	100,000
[2]$4.50 pfd. stock	6,498,000	6,155,000
Com. stock ($1)	1,321,458	1,261,458
Capital surplus	4,532,892	4,147,192
[3]Earned surplus	2,755,330	1,770,156
Total	$24,396,647	$20,895,631
Net curr. assets	$ 5,710,677	$ 5,054,816

[1] Lower of cost or market.
[2] No par shares: 1941, 64,980; 1940, 61,550.
[3] Restricted partly as to payment of common dividends.

PACIFIC COAST AGGREGATES, INC., San Francisco, Calif., reports that sales increased 62 percent in the first six months of 1941 as compared with the first six months in 1940. It is anticipated that sales for the last half of 1941 will show an equal if not better rate of increase. President A. K. Humphries announced that a dividend of five cents a share on the capital stock was paid on December 15 to stock of record December 1. The company also expects to pay quarterly dividends at the rate of not less than three cents a share throughout 1942. The current distributions represent the first since 1937, when five cents a share was paid.

•

THE STATE CEMENT PLANT of South Dakota has reported that prospects for continued good business in 1942 were in evidence, according to statements by Norbert De Kerchove, business manager and Julius Seiler, secretary-treasurer of the cement plant at Rapid City, S. Dak. Bonds are being retired and a reserve for depreciation is being set up. The last bonds will be paid off in 1943.

How can production be speeded? How can essential materials be best conserved? These, today, are vital questions.

With wire rope, the answer is in using the quality, construction and type that can be installed the quickest . . . that will last the longest, and thus do the most work for the amount of materials employed.

You can depend on Preformed "HERCULES" (Red-Strand) Wire Rope for this 2-Way Saving. It not only lasts longer — which means fewer replacements — but because it is easier to handle it can be installed more quickly. It provides all the advantages of the preforming process, *plus* the inherent qualities and advanced manufacturing methods that have long since caused the "Red Strand" to be recognized as the sterling mark for wire rope.

Why not take advantage of this 2-Way Saving? In doing so you will also be reducing your operating costs, for the principles that make "HERCULES" long lasting, also make for maximum economy.

Preformed "HERCULES" (Red-Strand) Wire Rope is furnished in both Round Strand and Flattened Strand constructions. In this one grade there is a right rope for every heavy duty service.

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A. LESCHEN & SONS ROPE CO.
WIRE ROPE MAKERS
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DENVER 1554 Wazee Street
SAN FRANCISCO 520 Fourth Street
PORTLAND 914 N. W. 14th Avenue
SEATTLE 3410 First Avenue South

Stockpiling

(Continued from page 60)

Highland Sand and Gravel Co., W. Roxbury, Mass., built a new plant at Dedham, Mass., in 1941, that does not have any bin capacity or any reclaiming system from stockpiles. Three grades of gravel and two of sand are stockpiled around the main plant by stacking belt conveyors, taking the materials direct from the production equipment. Barber-Greene loaders and a power crane load stockpiled material into trucks. Two 125-ton Blaw-Knox bins are filled for late evening and early morning loading. This system requires extra handling but is considered by the operator as aiding in reducing segregation. It is also necessary to drain the gravel, as well as sand, at this plant.

Metropolitan producers of aggregates have improved their facilities for loading out finished materials. A good example is the new Linthicum sand and gravel plant of the Arundel Corp., Baltimore, Md. Storage is in two parts. Sized materials are held in open bin storage of 400 tons live capacity over a reclaiming conveyor tunnel. Up to 100,000 tons storage capacity in open stockpiles is provided, using a 320-B Bucyrus-Erie dragline with a 3-cu. yd. clamshell bucket and a 175-ft. boom of aluminum alloy to handle and re-handle sand and gravel from the live storage bins over the tunnel.

Batchers Eliminate Need for Platform Scales

For loading trucks, the tunnel belt conveyor fills an 8-compartment, 600-ton Blaw-Knox steel bin. This bin, equipped with steam lines for winter operation, has two 3½-cu. yd. Blaw-Knox weigh batchers with Kron scales to weigh the material as it goes into trucks. The scales are equipped to print the weights on a card. With this arrangement, platform scales are unnecessary and aggregates may be weighed out in bulk trucks, in batch trucks or ready-mixed concrete trucks.

Other aggregates plants make frequent use of batching plants in stockpiling areas. Some of them, with reclaiming belt conveyors for loading trucks, load into steel bins which have platform scales under them, to weigh while loading. Portable conveyors for loading are coming into more use.

In the cement industry and other rock products plants that handle finely ground materials, bin level indicators and electric valves for discharge from bins are coming into more widespread use.

New packing plants, for portland cement, are being built that have the flexibility needed for handling a variety of cements. For example, a new one in the East built in 1941 will handle three varieties of cement without contamination at the rate of 1500 bbl. per hour.

The plant has three packing stations each consisting of two Modern Valve Bag 4-tube electric packing machines. Cement from three stockhouses is pumped by Fuller-Kinyon pumps through three lines into the packing plant. Each line has Fuller electric valves to route the cement from either line to either of the three packing stations.

Incoming cement, to either packing station, after alleviating the pressure in a cloth dust collector, is handled into a surge bin of 120-bbl. capacity. Rotary feeders pay the cement out into a two-way screw conveyor, that supplies the two packing machines. Sacked cement can be placed in railroad cars on either, or both, sides of the station by reversible wire mesh conveyors. Overflow cement enters a bucket elevator that is vented by a cloth dust collector and the reclaimed cement returns into the system.

10 REASONS WHY-

Men Like to Handle UNION-FORMED Wire Rope

1 **Union-Formed** (pre-formed) ropes resist unraveling and unlaying when cut.

2 They are more easily spliced because strands fit perfectly in place.

3 They are installed more easily and quickly.

4 They spool evenly and tightly, due to their freedom from crankiness.

5 **Union-Formed** wire ropes resist kinking, as the structure is inert.

6 They resist drum-crushing better, because of even spooling and firm body.

7 They end "porcupining." The wires when worn lay flat to the rope.

8 They socket better, as wires can be mule-tailed in an orderly fashion.

9 The strands and wires stay in fabricated balance; do not develop high strands or drawn wires.

10 They resist whipping associated with vibration.

WRITE FOR ROPE DOPE

Contains interesting current data on wire rope. Mailed without charge.

UNION WIRE ROPE CORPORATION
2156 Manchester Ave. Kansas City, Mo.
Tulsa • Houston • Chicago • Salt Lake City
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UNION Wire Ropes

The "ULTIMATE LOW COST WIRE ROPE"

1-42

Federal Government To Control All Road Building

WAR has brought about a close control by the federal government on all expenditures for highway construction by states, counties, and other governmental bodies as well as those directly sponsored by the federal authorities.

Thomas H. McDonald, chief of the Public Roads Administration, is quoted as follows on the new system of control which will be set up. "I have become liaison between the civilian road building agencies and the War department and the OPM and SPAB. Priorities on materials and equipment as well as strings on federal road money are going to control highway construction for the period of this emergency. Our scheme is for the public officials who are experienced and qualified in this field of activity to guide this control.

"The state highway departments are to pass judgment on all road construction, city and county, and forward recommendations to the Public Roads Administration for final O.K. before materials are released.

"The same setup, with all smaller governmental units working through the state highway departments, will handle the public works program, and the development of plans for construction to relieve unemployment during the economic emergency to follow the war. Where federal road money is involved, projects for 1942 construction are going to be limited almost exclusively to those of importance to national defense. They are going to be graded according to their importance to national defense."

G. Donald Kennedy of the Michigan highway department and president of the American Association of State Highway Officials, has called a meeting of the association to work out the application of the new federal policy. Standard designs of pavement will be worked out to save on steel reinforcement. This construction probably will involve the use of more concrete in slabs and other construction.

Phosphate Plants Expand Capacity

IN THE TENNESSEE FIELD, construction work on the large TVA phosphate plants is proceeding rapidly. The Louisville & Nashville Railroad has constructed a 16-car siding on the main line between West Harpeth and Thompson's Station for the use of the Federal Chemical Co., in handling rock from its recently purchased properties in that section of Williamson County, north of Columbia, Tenn. The new intake part of the Hoover & Mason Co., washing plant, is now in operation. There has been another transfer of 60 acres of mining lands near Grays Bend on Duck River from New Blue Grass Phosphate Co., to International Agricultural Corporation.

Phosphate and Potash Concern Changes Name

INTERNATIONAL AGRICULTURAL CORPORATION, 20 North Wacker Drive, Chicago, Ill., has changed its name to International Minerals & Chemical Corporation. This large manufacturer of phosphates, potash, fertilizers, and other chemicals has undoubtedly taken this step in keeping with the broader character of the company's business.

Start Gravel Plant

THE SWEET HOME SAND & GRAVEL Co., Sweet Home, Ore., has erected a plant on the Santiam river just north of this city. Edward Hurner is manager of this plant.

Gravel Plant Expands

MERCED SAND AND GRAVEL Co., Merced, Calif., is increasing its production to 40 cu. yd. per hour. Eight trucks are in service out of the plant.

Don't Scrap Those Worn Parts!

COLMONOY Will Put Them Back to Work!

Every new conveyor screw, gudgeon, pulverizing hammer or clinker plow you buy takes time and material that could be used in other ways.

Take a look at your worn parts. Many of them can be made serviceable by resurfacing the worn surfaces with COLMONOY. In most cases such reclaimed parts will actually outwear and out-perform new, unsurfaced parts many times over.

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123 W. Philadelphia St. WHITTIER, CALIF.

COLMONOY

Hard Surfacing Alloys and Overlay Metals

Grinding Developments

(Continued from page 66)

injected into the kilns just two seconds after it enters the mill and that hammers are replaced in less than ten minutes. Rate of coal feed into the mills at the Coplay plant, is varied automatically according to variations in the kiln burning temperatures as measured by a Brown radiation pyrometer.

Rod Mills

Particle shape was an important reason why rod mills were selected by the Liberty Limestone Corp., Rocky Point, Va., for the manufacture of stone sand from dolomite rock. Excessive production of extreme fines was not wanted either. Three Allis-Chalmers rod mills are in operation, one 5- x 12-ft. and two 6- x 12-ft. In producing sand, the rod mill product is first screened to set the top size for either masons or concrete sand and enters a 10-ft. Sturtevant air separator. Tailings from the air separator are the sand and the fines are sold for agricultural purposes. About 70 percent sand to 30 percent agstone is produced in this circuit. Agricultural stone is sometimes produced without stone sand, in the rod mills, closed-circuited with vibrating screens.

Stone sand must be produced to meet a number of different specifications. To change the gradation for either one, feed rates into the mills may be varied, screen openings can be changed and the air separator speed can be varied. Production of sand is about 14 railroad cars of 55 tons each in 24 hours.

Rod mills are also being used in the production of aggregates for Shasta dam in California, to break up and disintegrate the unsound particles and to reduce gravel to sand.

Grinding for "Micronized Mica"

"Micronized mica" is being produced by the English Mica Co. to finenesses of 100 percent through 325-mesh, or the equivalent of 1000-mesh, 2000-mesh or even 3000-mesh. The company has been granted an exclusive franchise by the International Pulverizing Co., Moorestown, N. J., on the process, which consists of the use of super-heated steam and the attrition of mica particles inside a special machine to perform the reduction. Highly specialized markets, such as for greases, the finishing of leathers, certain paints, etc., consume micronized mica. The process of manufacture was described in ROCK PRODUCTS, September, 1941, pp. 48-51.

Fire Damage

BECKER COUNTY SAND AND GRAVEL Co., Cheraw, S. C., plant suffered fire damage of $2500 recently due to defective wiring. Most of the damage was to motors and machinery. The plant has been shipping from 50 to 75 cars of gravel daily to defense projects.

QUARTZITE STONE Co., Lincoln, Kans., had a fire loss of $1000 at its concrete tile factory with damage to a mixer, motor, and a vibrator. J. R. Carlgren, one of the company officials, said that the plant would be moved to the concrete brick factory.

Correction

ON PAGE 43, ROCK PRODUCTS for December, 1941, under the title, "Crush Million Tons of Stone for T.V.A., it was stated that production facilities at the Strawberry Plains plant were limited to 80 tons per hour before improvements were installed to increase capacity to 400 tons per hour. Actual production before improvements was 150 tons per hour. R. P. Immel, vice-president of the American Limestone Co., lessee of the plant, advises that this plant was equipped with four electric blast hole drills, four 8-cu. yd. dump trucks with a maximum haul of 700 ft., two 2½ cu. yd. Bucyrus-Erie shovels; and a 30-in. Allis-Chalmers primary crusher.

It's The Famous Plymouth Transmission . . .
Change speeds quickly, with patented sliding gear action. One reason a Plymouth will do the job faster!
Look at The Massive Frame & Bumper Construction
There's where Plymouth builds extra strength, longer life into a locomotive.

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● When the *right* locomotive goes to work on your job, you start saving time, fuel, money. Get a free analysis of your locomotive problem — from Plymouth's industrial locomotive engineers. Write, wire or phone. . . .

PLYMOUTH LOCOMOTIVE WORKS

— Division of The Fate-Root-Heath Co., Plymouth, Ohio —

Plymouth GASOLINE • DIESEL • ELECTRIC • BUTANE • PROPANE Industrial Locomotives

Retrial of Denver Cement Anti-trust Case

NINETEEN Denver, Colo., cement dealers and producers who were indicted last April for alleged violation of the Sherman anti-trust law by conspiring to fix cement prices will again have to face trial on February 9, 1942. The defendants, including two producers, the Ideal Cement Co., and the Monolith Portland Midwest Co., were tried in federal district court in September but the jury was unable to reach a verdict. Originally, the new trial was scheduled for December 1, but due to the illness of Stanley W. Russell, sales manager of Monolith, was postponed.

Cement Exports Halted

SANTA CRUZ PORTLAND CEMENT CO., Davenport, Calif., has been at least temporarily halted by a recent naval order from making shipments of portland cement to island naval bases in the Pacific. The company holds orders to Midway Island and other outposts which have been under attack.

Cement Production At High Level

BUREAU OF MINES reports that the portland cement industry in November, 1941, produced 14,931,000 bbl., shipped 13,724,000 bbl. from the mills, and had in stock at the end of the month 17,624,000 bbl. Production and shipments of portland cement in November, 1941, showed increases of 17.3 and 32.3 percent, respectively, as compared with November, 1940. Portland cement stocks at mills were 13.4 percent lower than a year ago.

In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 157 plants at the close of November, 1941, and of 160 plants at the close of November, 1940.

RATIO (PERCENT) OF PRODUCTION TO CAPACITY

	Nov. 1940	Nov. 1941	Oct. 1941	Sept. 1941	Aug. 1941
The month	60.1	72.7	78.6	78.3	76.5
12 months	49.9	64.5	63.7	62.5	61.0

Concrete Pavement Yardage

AWARDS of concrete pavement for November, 1941, have been announced by the Portland Cement Association as follows:

	Square Yards Awarded During November, 1941
Roads	2,570,026
Streets and Alleys	1,239,051
Airports	534,500
Total	4,343,577

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KEYSTONE
REGISTERED U. S. PATENT OFFICE

Model 51

BLAST HOLE DRILL

"Can Take it" with its Welded & Riveted Frame

Select a Keystone Blast Hole Drill and you can be sure of getting a superior piece of equipment that will give you dependable performance for years on your drilling.

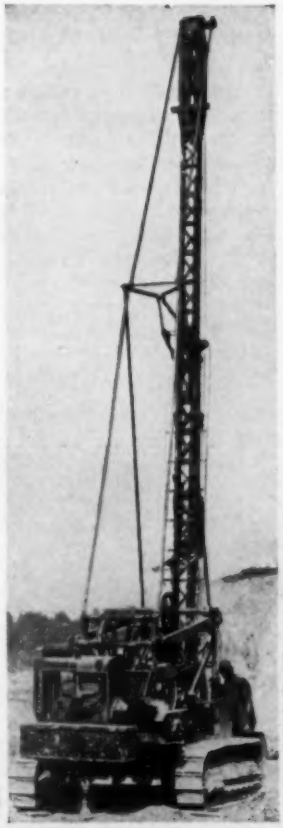
The outstanding feature of this modern rock drill is its welded and riveted sturdy frame. Pounding down six inch holes in hard rock, gives a rock drill a lot of punishment—and that is why Keystone engineers employed a combination of both welding and riveting to give it a rugged and durable frame foundation.

The working mechanism of the Model 51 crawler traction drill is likewise made to take rough service. Shafts and anti-friction bearings are oversized. The length and character of the stroke are adjustable to give greatest efficiency.

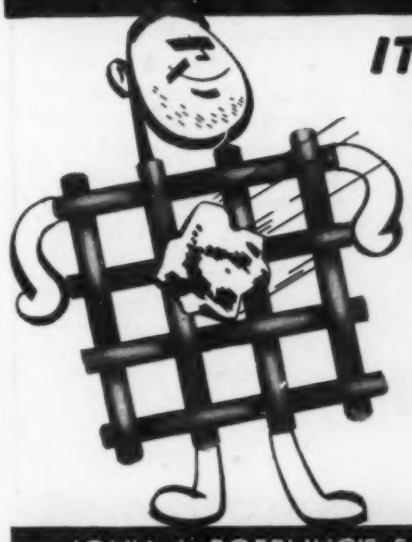
Keystone Model 51 is truly the modern, streamlined rock drill to speed up your 1942 drilling operations.

You will want to know more about it. Write for bulletin BD-1141.

KEYSTONE DRILLER CO.
Beaver Falls, Penn.



ROEBLING
Abraso Screen



IT'S TOUGHER...

because it starts with "tailored" steel!

Ordinary steel won't do—for screens that must give extra service in grading stone and gravel. That's why Roebling makes every pound of steel that goes into Roebling Screening—makes it in small, closely-controlled furnaces—to the exact analyses that mean utmost resistance against wear and vibration.

Then, the wire is drawn and tempered to Roebling standards, established by years of wire-making experience. And finally, fabricated into an accurate-mesh screen that assures proper grading—maximum production.

JR ROEBLING

JOHN A. ROEBLING'S SONS COMPANY TRENTON NEW JERSEY

Sand and Gravel Industry Needs in 1942

NATIONAL SAND AND GRAVEL ASSOCIATION, in response to a request of the O.P.M. made a hasty survey of the probable requirements of its industry in critical materials for maintaining continued operation of existing plants without expansion of capacity—this in connection with the coming allocation of such critical materials. The survey covered ten representative companies operating 38 plants and producing 20,000,000 tons in 1941.

The Association (Stanton Walker, director of engineering) estimates 1941 production at 25 percent in excess of 1940, or an estimate of 270,000,000 tons in 1941 as against 238,308,000 tons in 1940. For 1942 the estimate is for 300,000,000 tons. Based on the requirements of the companies tested $12,200,000 worth of equipment and supplies will be needed by the industry in 1942. More than one-third of this is for unclassified equipment and supplies, the next largest items are: (2) crushers, screens, scrubbers, log washers, pumps, etc.; (3) cranes, draglines, hoists, loaders, bulldozers, scrapers, etc.; (4) automobiles and trucks. These and concrete truck mixers account for more than half of the total.

★ ★ ★

CINCINNATI CONVEYOR BELTS

ARE "SPEEDING THINGS UP" FOR U. S.

Cincinnati Conveyor Belts are "speeding things up." They are handling tremendous tonnage of sand, gravel, crushed rock, etc., quickly . . . efficiently . . . economically. They are speeding up the supply of aggregate for army camp construction, vital roadways and buildings necessary for manufacturing weapons for our great Army, Navy and Air Corps.

Yes, Cincinnati Conveyor Belts are doing war duty in sand and gravel plants . . . in rock crushing plants . . . in cement plants throughout the country. They're equal to the task, too, because they still retain the same high quality that has enabled them to build fine performance records for many years.

The Cincinnati Rubber Manufacturing Co.
Cincinnati, Ohio

CINCINNATI CONVEYOR BELTS

Important Priorities Change

PRIORITIES REGULATION No. 1, the basic document which governs the operations of the priority system, has been amended in several important respects effective December 23.

Most important of the changes is a requirement that *all* orders bearing a priority rating, including B ratings for essential civilian orders as well as A ratings for defense orders, must be accepted by producers, in preference to any unrated order. Previously the acceptance of B-rated orders was not mandatory.

Further Step Toward Allocation

The required acceptance of B-rated orders is a further transitional step in the move toward allocation of scarce materials, since B ratings are one method of designating the relative importance of civilian uses for materials after war requirements have been met.

Treatment which must be given to defense orders is clarified by a new provision which assigns a priority rating of A-10 to all defense orders not otherwise rated. This change is intended to eliminate any confusion which might arise as to the handling of those defense orders which were previously unrated, in relation to other orders which had been specifically rated A-10, the lowest rating in the A series.

Sand-Lime Brick Production and Shipments

EIGHT ACTIVE sand-lime block and brick plants reported for November and eight for October, statistics for which were published in December.

AVERAGE PRICE FOR NOVEMBER

	Plant Price	Delivered Price
Grand Rapids, Mich.	.....	$14.00
Detroit, Mich.	.....	.....
Sebewaing, Mich.	$10.50	.....
Saginaw, Mich.	12.00	.....
Seattle, Wash.	16.50	18.50
Mishawaka, Ind.	13.00	.....
St. Louis, Mo.	.....	.....
Watertown, Mass.	12.50	13.50

STATISTICS FOR OCTOBER AND NOVEMBER

	*October	**November
Production	4,220,150	3,253,810
Shipments (rail)	474,500	78,500
Shipments (truck)	3,538,306	3,134,427
Stock on Hand	1,954,605	1,236,030
Unfilled Orders	1,475,000	800,000

*Eight plants reporting: incomplete, one not reporting stock on hand and two not reporting unfilled orders.

**Eight plants reporting: incomplete, one not reporting stock on hand and three not reporting unfilled orders.

GET THE MOST OUT OF YOUR

Vibrating, Revolving or Shaking

SCREENS

For vibrating, revolving or shaking screens, Hendrick Perforated plate is the screening medium with every advantage:

—available in any size or shape of perforation

—single or double corrugations; flat or rolled to any diameter

—uniform mesh maintained for the life of the plate

—available in a variety of metals.

Write for a copy of "Perforated Plate for Vibrating and Shaking Screens."

Elevator Buckets
All types—All Sizes
Light and Heavy Steel Plate Construction
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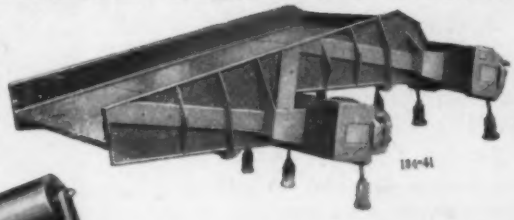
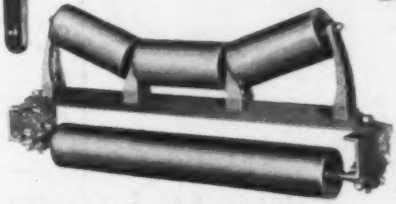
CHECK THESE SERVICE FACTORS

A type and size chain for every conveying, elevating and power transmission need. Peerless, detachable and steel knuckle are shown.

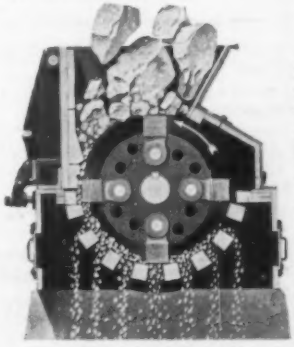
In handling quarry materials, of course you want economy, efficiency, and maximum freedom from costly and annoying maintenance problems. You get these in Jeffrey products, designed and manufactured for handling stone, gravel, sand, etc.





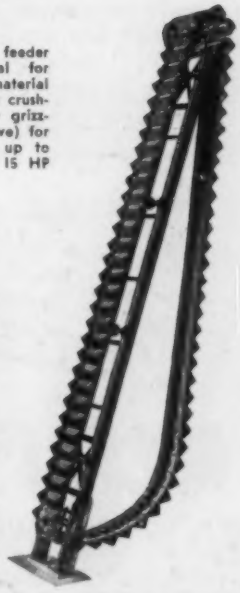
Jeffrey belt idlers are furnished in both troughing and flat belt types in widths from 14" to 60". Heavy steel rolls, accurately balanced and equipped with Timken tapered roller bearings.

Jeffrey-Traylor electric vibrating feeder (patented) J-T feeders ideal for handling large run-of-quarry material from surge hoppers to primary crushers, hammermills, trommels or grizzlies. Special large feeder (above) for handling 48" lumps at rates up to 2000 T.P.H. with maximum of 15 HP required.



Jeffrey-Traylor grizzly feeder (right) for by-passing fines ahead of primary and secondary crushers, screens, picking belts. Also electric vibrating screens and feeders (patented).

The Jeffrey Miracle hammer crusher (left) is used for reducing large pieces of limestone, shale, slag and cement rock. Steam shovel size to 1", 2", 3" or 4" and under in one operation.



THE JEFFREY MANUFACTURING COMPANY

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Baltimore	Cincinnati	Houston	Pittsburgh
Birmingham	Cleveland	Huntington	St. Louis
Boston	Denver	Milwaukee	Scranton
Buffalo	Detroit	New York	Salt Lake City
Chicago	Harlan	Philadelphia	Terre Haute

Operating conditions, capacity or class of material make no difference—there is a Jeffrey bucket elevator to do the job. A complete line of standardized units. An inclined continuous elevator is shown right.

Traffic and Transportation

PROPOSED RATE CHANGES—The following are the latest proposed changes in freight rates up to and including the week of December 20:

Central

Sup. 1 to W.D.A. 67497. **Lime, chlorinated,** C. L.—W.D.A. 67497, D.B. 3089, dated June 21, 1941, covering proposal to cancel export rates on, from Wyandotte, Mich., to Baltimore, Md., Boston, Mass., New York, N. Y., Newport News, Norfolk, Va., and Philadelphia, Penn., published in Item 23860 of C. F. A. L. Tariff 218M, and similar rates in individual lines' tariffs, is hereby withdrawn from docket account objections have been recorded to cancellation of these rates.

68785. **Lime, chemical,** in bulk, C. L., min. wt. 120,000 lb., except when car of lesser capacity is furnished, but in no case less than 100,000 lb. Establish on, from Mosher and St. Genevieve, Mo., to Louisville, Ky., 12½c, via Mo.-Ill. R. R., Salem, Ill., B. & O. R. R.

68832. (a) **Sand,** all kinds, and **gravel,** in open top cars only, C. L., and in closed cars. (b) **Sand,** naturally bonded molding, in all kinds of equipment, C. L.; **sand** (except industrial), in closed equipment, C. L., **sand** (except industrial), in open top equipment, C. L. (See Note 1). Establish on, from Haven, O.

Proposed rates (cents per net ton)

	Descriptions (a)	
To	Open	Closed
Lancaster, Ohio	138	159
New Castle, Penn.....	...	...
Washington, Penn.	...	...
Detroit, Mich.	...	...
	(b)	
Lancaster, Ohio	...	...
New Castle, Penn.....	160	198
Washington, Penn.	187	209
Detroit, Mich.	116	154

Note 1—Rates will not apply on shipments in cars with tarpaulin or other protective covering. In such instances the rates applicable on shipments in box cars are to be assessed.

68844. **Sand** (except naturally bonded moulding; ground or pulverized sand) in closed equipment, C. L. Establish on, from Essex, Ill., to South Bend, Ind., 165c per net ton, via usual available routes.

68847. **Concrete mix,** consisting of cement and fine aggregate, or of cement and fine and coarse aggregate, dry, in paper sacks, C. L., min. wt. 50,000 lb. Establish on, from Cincinnati, O., to Pittsburgh, Penn., 17c.

68862. **Lime, common, hydrated, quick or slaked,** C. L. Establish on, from Detroit, Mich., to Barberton, O., 15c, min. wt. 30,000 lb.; 12c, min. wt. 50,000 lb.

68708. **Limestone (unburnt), ground or pulverized,** in straight or mixed C. L., min. wt. 60,000 lb. Establish on, from Greencastle, Ind., to pts. in Wis. and Minn., rates as shown below:

Proposed rates from Greencastle, Ind., to Ashland, Wis., 358; Chippewa Falls, Wis., 336; Elroy, Wis., 292; Fond du Lac, Wis., 259; Long Lake, Wis., 336; New Richmond, Wis., 369; Oshkosh, Wis., 270; Park Falls, Wis., 336; Pembine, Wis., 314; Portage, Wis., 270; Prentice, Wis., 325; Rice Lake, Wis., 358; Star Lake, Wis., 336; Wausau, Wis., 292; Wisconsin Jct., Wis., 325; Woodruff, Wis., 325; Wyeville, Wis., 303; Duluth, Minn., 391; Minneapolis, Minn., 369; St. Paul, Minn., 369. Rates being in cents per 100 lb.

Trunk Line

40311 (shippers). **Limestone,** ground, pulverized, broken or crushed, C. L., min. wt. 60,000 lb., from Pleasantville, N. Y., to Scotia, N. Y., 220c per net ton, in lieu of current 6th class rate. Reason: (See Note 5).

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

Note 4—Reason: No present or prospective movement.

Note 5—Reason: Comparable with rates from other origins in immediate vicinity.

Note 6—Rates will not apply on shipments in cars with tarpaulin or other protective covering. In such instances the rates applicable on shipments in box cars are to be assessed.

Note 7—The oil, tar or asphaltum not to exceed 10% of weight of the commodity shipped, the shipper to so certify on shipping order or bill of lading.

POINTS OF PROGRESS
IN REPUBLIC CONVEYOR AND ELEVATOR BELTING

THROUGHOUT the years of experience which have, long since, established Republic as a national authority on conveyor belt problems, Republic has held a leading position in the actual advancement of this type of equipment. Major Republic developments have been in the compounding of rubber and principles of construction which provide increased resistance to such destructive service factors as excessive abrasion, impact, etc. Provar Process, exclusive Republic treatment, permanently protects Republic Conveyor and Elevator Belts against mildew. Republic has been exceptionally successful in the adaptation of synthetic rubber to conditions of excessive presence of oil . . . REPUBLIC RUBBER DIVISION OF LEE RUBBER AND TIRE CORPORATION, YOUNGSTOWN, OHIO.

This Emblem designates a member of Republic's nationwide network of Industrial Distributors - exclusive outlet for Republic Mechanical Rubber Products. He is equipped, with his own facilities and the full cooperation of the factory, to supply and service your requirements with greatest obtainable speed and efficiency.

Accredited REPUBLIC RUBBER PRODUCTS Distributor

REPUBLIC RUBBER
HOSE • BELTING • MOLDED GOODS
PACKING • EXTRUDED PRODUCTS

40313 (increase) (carriers). To cancel commodity rates on **stone, natural** (other than bituminous rock), crushed, uncoated or coated with oil tar and/or asphaltum, C. L., from D. L. & W. R. R. stations, New York Lighterage stations, Hoboken, Jersey City, Paterson, Bernardsville, N. J., Bangor, Portland, Nicholson, Penn., Binghamton, Syracuse, Utica, N. Y., and other points to stations on D. L. & W. R. R., D. & H. R. R., Erie R. R., L. V. R. R., P. R. R., Reading Co. and various others as published in D. L. & W. R. R. Tariff I. C. C. No. 23799. Reason: Account no present or prospective movement.

M-4398 (increase) (carriers). To cancel all rates on **ground limestone**, from Greer, W. Va., to all destinations in the states of Pennsylvania and New York. Reason: Account no present or prospective movement.

40315 (shippers). (A) **Sand** (other than industrial) and gravel, in open top cars without tarpaulin or other protective covering, C. L.; (B) **sand and gravel** (other than ground or pulverized), in closed cars or in open top cars with tarpaulin or other protective covering, C. L.; and **sand**, naturally bonded moulding, open top or closed cars, C. L.; and (C) **sand**, ground or pulverized, C. L. (See Note 3), from Toms River Group, viz.: Farmingdale, Lakewood, Pinewald, Quail Run, South Lakewood, Toms River and Whitings, N. J., to Clinton, N. J., (A) 154c, (B) 165c, and (C) 182c per net ton. Reason: (See Note 5).

40330 (shippers). **Ganister rock**, not ground, C. L., min. wt. 90 per cent of marked capacity of car, etc., from Claysburg and Sproul, Penn., to Mt. Union, Penn., 105c per net ton. Reason: Comparable with rates from other points.

40355 (shippers). To establish from Philadelphia, Penn., to Devault and Exton, Penn., commodity rates of 125c per gross ton on **barium**, carbonate of, crude, 140c on fluorspar, 150c on beryllium ore, strontia ore and Rutile ore, 125c on chrome ore, ilimenite ore, manganese and zirconium ore, subject to min. wt. of 90 per cent of marked capacity of car, etc., in lieu of current 6th class rates. Reason: Comparable with rates from and to other points.

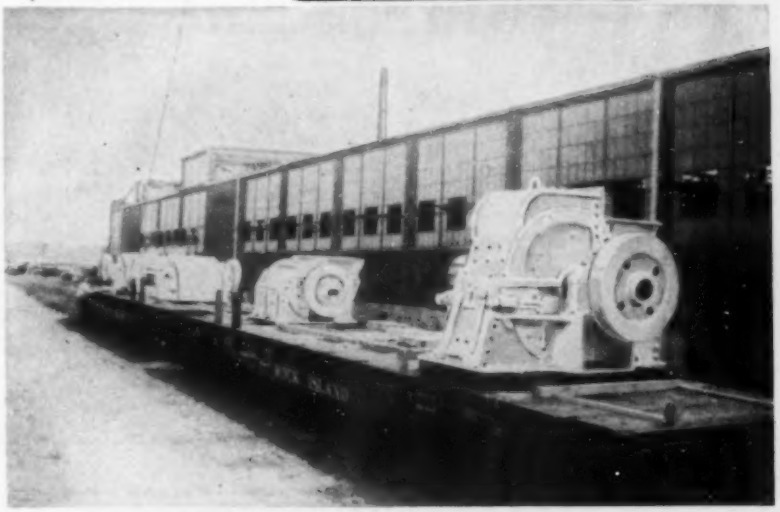
40374 (shippers). **Asphalt filler**, C. L., min. wt. 60,000 lb., from Middle Granville, Granville, N. Y., Poultney and Castleton, Vt., to Perth Amboy, N. J., 275c per net ton, in lieu of current 6th class rate of 25c per 100 lb. Reason: (See Note 5).

40376 (shippers). **Crude dolomite**, C. L. (See Note 3), from Millville, W. Va., to Allegheny, Bessemer, Demmler, Etna, Glassport, Junction Trans., Laughlin Junction, McKeesport, McKees Rocks, Monessen, Neville Island, Pittsburgh, Rankin, Wylie, Clairton, Donora, Johnstown, and Scottdale and Dunbar, Penn., 116c per gross ton, and from Billmyer, Penn., to P. R. R. stations, viz.: Johnstown, East Pittsburgh, Bessemer, Pittsburgh stations, Scottsdale, Dunbar, Munhall to McKeesport, Clairton, Donora to Charleroi, Vandergrift, Leechburg, Brackenridge, Verona, New Kensington to P. & L. E. stations, Neville Island, McKees Rocks, Monessen and Glassport, Penn., 116c per gross ton, and from Pleasant Gap, Penn., to P. R. R., Pittsburgh stations and to Monessen, Penn., on P. & L. E. R. R., 116c per gross ton, in lieu of current commodity rates. Reason: (See Note 5).

40378 (increase) (carriers). To cancel commodity rate of 20c per 100 lb. on **crude feldspar**, C. L., from Dekalb Junction, N. Y., to Buckingham, Que., as published in Item 2540 of N. Y. C. R. R. Tariff I. C. C. No. 296. Reason: (See Note 4).

40401 (shippers). **Mica, scrap and mica ore, waste**, crude, in straight carloads 50,000 lb., in mixed carloads 60,000 lb., from Dolbeau, Que., to Rutherford, N. J., 41c per 100 lb., in lieu of current 5th class rate of 66c per 100 lb. Reason: (See Note 5).

Aluminum Company of America Equipping All Plants with DIXIE HAMMERMILLS



WHEN PRODUCTION CANNOT FAIL DIXIE HAMMERMILLS GET THE CALL!

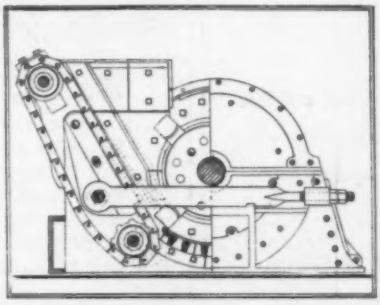
Aluminum . . . and more aluminum! That's the call today. And the Aluminum Company of America has responded with a mighty all-out production effort that is winning the praises of the nation.

In such an emergency, men and machines alike, cannot fail. They must be picked on known ability . . . on past records of performance. For this reason we are proud that the Aluminum Company of America is using Dixie Hammermills exclusively for all its crushing needs.

We are also proud that deliveries on the huge order recently placed are being made ahead of schedule.

Because of their brilliant records in maintaining steady production of uniform quality . . . when other types of crushers failed . . . Dixie Hammermills are playing an increasingly important part in both defense and civilian industries.

Write for Free Booklet, "More Efficient Crushing of Raw Materials."



DIXIE

NON-CLOG

HAMMERMILLS

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Crush • Grind
Pulverize • Shred

DIXIE MACHINERY MFG. CO.
4202 Goodfellow Blvd., St. Louis, Mo.

YOUR LOCOMOTIVE WILL CLIMB

..and so will your profits if you power with SHAY!

The Lima Shay Geared Locomotive is built to speed up transportation . . . *economically!* The three cylinder engine and flexible geared drive to all wheels, assure smooth, quick operation over uneven track and around sharp curves without danger of derailment.

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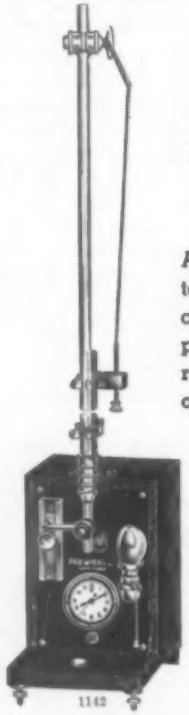

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A convenient method for determining the particle size percentage relation of various powdered materials below the range of the standard sieve analysis.

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Q-82

34 JOB PHOTOGRAPHS

The new Barber-Greene Bucket Loader Catalog 82 shows 34 photos of B-G Loaders saving time and money on different types of work including: truck loading from stock piles, road shoulder cleanup, top soil stripping, reclaiming, screening, loading scarified base, etc. Also specifications and accessories. Write for your copy.

BARBER GREENE
AURORA ILLINOIS

FREE! New Literature

THE bulletins and catalogs described below are for your benefit. To save you the necessity of writing individual letters, those you want can be obtained by merely checking and mailing the coupon on next page.

1 BRICK.—W. E. Dunn Mfg. Co. has brought out a colorful book entitled "Four Keys to Success" which describes and illustrates the advantages of Dunbrik and Dunstone, the master key being the Dunbrik machine which turns out standard and jumbo Dunbrik in both common and face and Dunstone in many sizes. A large picture of the machine and its specifications are given on a separate sheet.

2 BRICKMAKER.—R. F. Reed Co. has issued an interesting four-page folder describing and illustrating how you can make your own brick for houses, foundations, fireplaces, chimneys, walks, wells, tanks, etc., with the Little Dave brickmaker. Machine specifications are also given.

3 BUCKETS.—Electric Steel Foundry has released two bulletins, one on dragline buckets and the other on mining buckets.

4 BUCKETS.—Blaw-Knox Co. has issued a new bulletin (No. 1812) on buckets for cement, chemical and fertilizer plants. Included in the bulletin are two-line and three-line clamshells; medium weight two-line lever arm type buckets for high speed towers; two and three-line cement clinker buckets; and four rope double lever arm buckets for cement and stone plants.

5 BUCKET LOADERS.—The Jeffrey Mfg. Co. 11-page Catalog No. 759 describes and illustrates different types of portable bucket loaders. The catalog also includes general specifications.

6 BULLDOZERS.—Baker Mfg. Co. 28-page bulletin No. 834 graphically explains the operations and benefits that accrue from the use of their bulldozers and grade-builders with the direct hydraulic lift and down pressure. Complete specifications are given and candid shots of machines at work on highways, flood control, soil conservation, defense, housing, stripping, bridge approach grading, pit work and other projects.

7 CHAINS.—S. G. Taylor Chain Co. has issued a new series of bulletins found in catalog form. This 28-page catalog illustrates and describes many types and grades of chain made by them. One section is devoted to sling and crane chains; the other features BBB coil chain, high carbon electric weld loading chain, log chain, etc. Of interest to engineers, maintenance men and other chain users is the data relating to "proof tests," chain terminology and tables illustrating safe loads for chains and slings for different variations in the angle of the load.

8 CONCRETE BLOCK MACHINE.—Mortarless Tile Machine Co., Inc., has issued a four-page sheet describing and illustrating their concrete block machine which, under ordinary operation, with a full crew, will turn out four blocks per minute. General specifications and a detail of the various phases of construction of a one-story residence are shown on a separate sheet.

9 COMPRESSOR.—Worthington Pump & Machinery Corp. has issued a new bulletin No. S-550-B19 describing and illustrating LFC angle gas engine-compressor.

10 CONTROL INSTRUMENTS.—The Bristol Co. has published Bulletin No. 585 covering air-operated and electrically operated automatic control instruments, recording and indicating instruments, and telemetering instruments for recording and remote automatic control.

11 CONTROLLERS.—The Foxboro Co. has announced the new Model 30 Stabilog recording and indicating controller which is fully described and illustrated in Bulletin A-252. The new controller has a universal rectangular case, suitable for any method of mounting. There are no protruding hinges, hasp or adjustment knobs. When panel-mounted the instrument extends forward only ¾ in.

12 CONVEYORS.—The Jeffrey Mfg. Co. has issued a 19-page Catalog No. 761, describing and illustrating different types of portable scraper conveyors.

13 CONVEYORS. — Pioneer Engineering Works has announced a new book, Form No. 600 giving facts, figures and pictures of its predesigned and prefabricated steel frame conveyors, including all necessary parts for easy assembly in the field.

14 CRUSHING PLANT. — Iowa Mfg. Co. "Pitmaster" portable crushing plant is described in a new two-color single sheet bulletin No. PIT-1. Action photos of two models show various combinations of conveyors and elevators. The operation of the plant is described and a diagram shows the flow of material through the equipment. Complete specifications of Models 10-18 and 10-22 are given.

15 CRANE CONTROLS. — Westinghouse Electric & Mfg. Co. new leaflet B-3020 describes crane controls for hoist motors up to 330 hp. for use in materials handling. It is claimed that since there is no contactor in the armature circuit, it is not possible on lowering for the armature to be de-energized through the failure of a contactor without setting the magnetic brake at the same time. This eliminates the hazard of dropping the load if one of the contactors should fail.

16 CRUSHERS.—Iowa Mfg. Co. new Bulletin No. A-4 contains specifications, illustrations and descriptions of the Cedarapids roller bearing and plain bearing jaw crushers.

17 CRUSHERS.—Allis-Chalmers Mfg. Co. new 16-page Bulletin No. B-6006-B contains numerous sectional views and actual installation photographs of the Type "B" reduction crusher with speed-set product control which, it is claimed, can handle from 10 to 275 tons per hour.

18 DIESEL ENGINES.—Worthington Pump & Machinery Corp. new Bulletin S-500-B38A describes and very clearly illustrates the DD-5, DD-6 and DD-8 Diesel engines. A vertical cross-section of the Diesel engine is also shown.

19 DRILLS.—Independent Pneumatic Tool Co. has issued Bulletin P-1236 containing information on the THOR No. 377 class rotary pneumatic close corner drill, non-reversible and reversible types, which is developed to cut the time required for heavy duty close quarter work to one-half.

20 PUMPS.—Worthington Pump & Machinery Corp. has issued three bulletins Nos. W-304-B2, W-412-B30 and W-483-B1, describing centrifugal, rotary and power pumps.

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21 DRYERS. — Centrifugal & Mechanical Industries, Inc., has released a bulletin descriptive of its dryers and clarifiers, containing many interesting illustrations.

22 EXCAVATING. — R. G. LeTourneau, Inc., has released two new booklets, TP-104 and TR-102, giving valuable information, facts and illustrations on the Tournapull, Models C and Super C.

23 EXCAVATOR.—Link-Belt Co. new 4-page Folder No. 1914 illustrates and describes its ½-yd. Model LS-50 crawler shovel-dragline-crane. Clearances, dimensions, lifting capacities, and brief specifications, are given.

24 FLOTATION. — Denver Equipment Co. has issued Bulletin No. F 11-B giving timely information on various applications of flotation for the separation of minerals. Flowsheets, drawings, and installation photographs show operating details.

25 HYDRAULIC CONTROL HOSE.—The B. F. Goodrich Co. has issued a new four-page catalog section describing the functions and uses of high pressure hydraulic control hose. A formula for figuring the correct bending radii for various sizes is one of the valuable parts of the catalog section. Commonly used and special sizes are listed in tables, as well as couplings, spring guards and adapter unions.

26 JAW CRUSHER.—Iowa Mfg. Co. single sheet bulletin No. PP-1 illustrates and describes the portable jaw crusher and heavy duty steel apron rock feeder. Two action pictures show this equipment in operation. Important features and complete specifications are given. This plant may be moved in and out of quarries and on the highway by a truck-tractor.

27 PULVERIZERS.—Whiting Corp. has issued a new bulletin (FY-103) featuring its pulverizers for firing cement kilns. These Impact Pulverizers are made in five sizes, maximum capacities ranging from 700 to 6500 lb. of fuel per hr.

28 PUMPS.—Pomona Pump Co. Bulletin No. 29 contains practical information concerning adaptation of its pumps for a wide range of duties under varying conditions; also some illustrated case histories of varied applications and drawings for installation.

29 PUMP.—Pennsylvania Pump & Compressor Co. has announced a new multi-stage pump bulletin No. 237. An outstanding feature is the patented method of effecting non-leakage, dynamic hydraulic balance.

30 RAIL CLAMPS.—Robins Conveying Belt Co. Bulletin No. 114 graphically illustrates the importance of rail clamps for movable structures. The bulletin is illustrated in two colors and gives information on different types of rail clamps.

31 SCRAPER. — LaPlant-Choate Mfg. Co., Inc., new 16-page booklet in two colors describes the CW-10 "Carrimor" scraper thoroughly and tells of the history and development of the scraper and describes the many design features. Included also is a section on the TW-10 Carrimor Scraper.

32 SCREENS.—New Holland Machine Co. has published a bulletin on circle-throw vibrating screens, and revolving screens.

33 SCREENS.—Denver Equipment Co. has issued a four-page bulletin (No. S3-B3) describing and illustrating floating circle motion vibrating screens.

34 SHOVELS.—The Marion Steam Shovel Co. has brought out a booklet describing and illustrating 17 different types of shovels, draglines, cranes, clamshells, pull-shovels and walkers.

35 STEEL.—Joseph T. Ryerson & Son, Inc., has issued a booklet which compares the new AISI steel specification with the old SAE specification as applied to carbon and alloy steel bars. The booklet contains all the latest official data for both of these new systems of identification.

36 STEEL FORMS.—Blaw-Knox Co. has brought out a 60-page hinged booklet Catalog No. 1836, illustrating and describing steel forms, including forms for circular, elliptical, horseshoe shaped and box shaped conduits, vehicular tunnels; walls; piers; dams; caissons, etc.

37 SWITCHGEAR.—Allis-Chalmers Manufacturing Co. has printed a comprehensive bulletin, B-6012A, giving complete coverage of switchgear equipment for application wherever electricity is used or produced.

38 SYNTHETIC RUBBER GASKETS.—The B. F. Goodrich Co. has sent out a bulletin on the use of Ameripol, a new synthetic rubber, for gaskets and rings assembled with machines to keep oil or grease confined in bearings. Synthetic rubbers have been found more suitable to resist corrosive action of petroleum derivatives.

39 TRANSMISSIONS.—Graham Transmissions, Inc., are issuing a monthly digest of current technical news for industrial executives. Known as the Graham Dial, the publication contains a brief abstract of outstanding articles in the technical press. Articles presented are chiefly from original engineering sources so that the information is fresh and authentic; subject matter is "boiled down" to just the essential facts, with the source given in full so that the interested reader may readily refer to the complete article. Included are brief articles on metallic traction and variable speed transmission.

40 TRUCKS.—Towmotor Co. has released 26 pages of detailed specifications on seven models of Towmotor gasoline-powered lift trucks, capacities from 2000 to 10,000 lb. Each page discusses in detail one problem of industrial handling. Also shows present users how to get the most out of these machines, and helps in selecting models that will "team up" profitably with ones in service.

41 WIRE ROPE SAFETY. — American Chain & Cable Co., Inc., Hazard Wire Rope Division, has issued a most comprehensive booklet on the safe use of wire rope. This booklet gives tables of breaking strengths, constructive information on effects of acceleration, and many other points of interest. While the booklet is 24 pages in volume, it is folded for convenient pocket use.

42 WIRE SCREENS. — Robins Conveying Belt Co. has issued Bulletin No. 113 describing and illustrating woven wire screen cloth. Specification tables are included, also their recommendations for various applications.

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(1-42)

ROCK PRODUCTS, 309 W. Jackson Blvd., Chicago, Ill.

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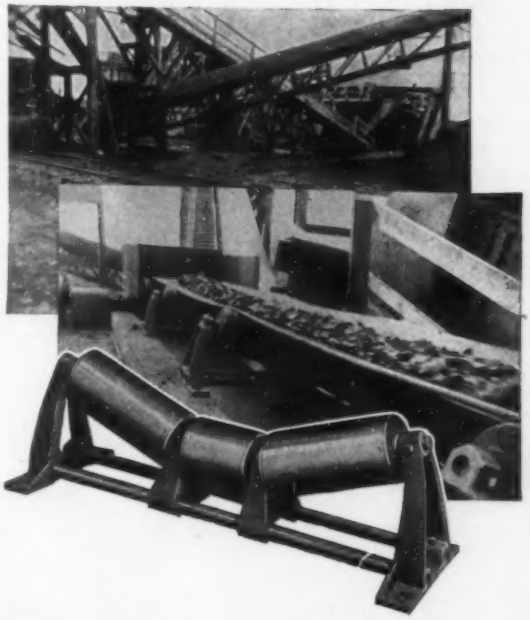
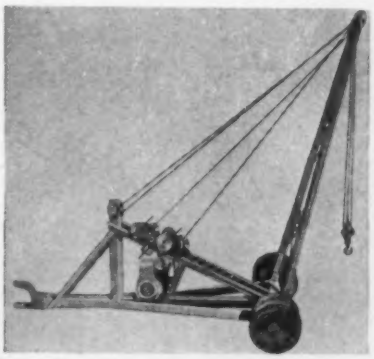


Whether at the iron mines of Minnesota or the mills and factories of Pittsburgh or Saint Louis, DIAMOND conveying equipment daily carries tons upon tons of materials or manufactured products smoothly, quickly, economically and satisfactorily.

DIAMOND conveying systems can be applied to nearly any carrying problem in most any line of business. Ask for information and suggestions.



The PORTA CRANE is the answer to many a daily problem of lifting and moving on the job. Portable. Can be hauled from place to place. Will lift and move, and can even be used as a dragline. Ask for complete details and prices.

DIAMOND is making astonishingly prompt deliveries on conveyors, Porta Cranes, crushers, screens, etc. Write for prices and full information.

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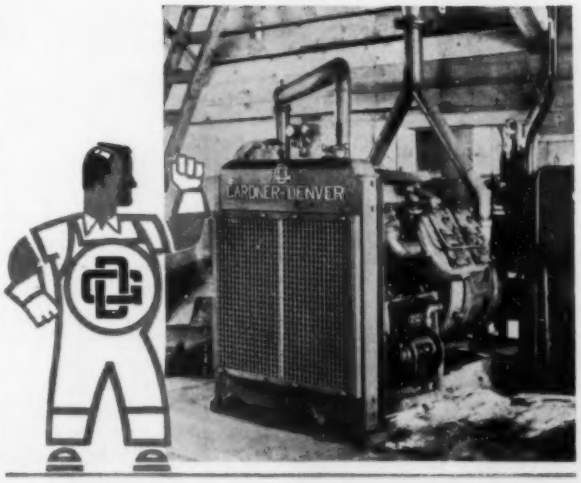

"MORE POWER TO YOU!"...

Says

"Gardy" DuMuch

The Gardner-Denver S-73 Sinker is known as "67 pounds of speed and power." It is easy to hold—drills more footage faster.

A COMPACT "package" of power to increase productive capacity! That's what "Gardy" DuMuch —symbol of Gardner-Denver superiority — gives you in the Gardner-Denver "WB" Vertical Water-Cooled Compressor. This rugged unit is specially designed to conserve space, has efficiencies comparable to those of larger machines. It's fully water-cooled for lubricating oil economy and cooler discharge temperatures. Castings of GarDurloy—the modern, high strength cast iron developed by Gardner-Denver—give extra strength and hardness where needed. Furnished with direct motor mounting or sheave for "V"-belt drive . . . displacement from 142 to 445 cu. ft. per min. For full information, write Gardner-Denver Co., Quincy, Ill.

GARDNER-DENVER PRODUCTS HELP SPEED VICTORY

USER REPORT FROM AN ALABAMA QUARRY—"The Gardner-Denver 'WB' Compressor in our Alabama quarry is used to supply compressed air to operate two wagon drills, drilling a total of 30 twenty-foot holes in hard limestone every ten-hour day. Our superintendent states that there is plenty of air at all times to operate these units . . . we are satisfied with our compressor and think it's tops!"

GARDNER-DENVER *Since 1859*

MORE
"RUGGLES-COLES"
DRYERS
ARE USED THAN
ANY OTHER MAKE

DOUBLE SHELL
SINGLE SHELL
DIRECT HEAT
INDIRECT HEAT

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COMPANY, INCORPORATED • YORK, PENNSYLVANIA
NEW YORK, CHICAGO, SAN FRANCISCO, TORONTO

Touring Crusher Unit Travels 15,000 Miles

AFTER covering 15,000 miles in 15 states, the truck-mounted Allis-Chalmers type "R" crusher demonstrator unit has returned to Milwaukee, Wis.

Starting last January, after the conventions in Cincinnati, several hundred demonstrations were made to give producers an opportunity to observe at first hand how this type of crusher handled their own materials under conditions peculiar to their plants. These demonstrations were made in plants in Indiana, Illinois, Ohio, Kentucky, Tennessee, North Carolina, South Carolina, Georgia, Virginia, West Virginia, Pennsylvania, New York, Massachusetts, Michigan and Wisconsin.

A feature of the Type "R", speed set control, was largely responsible for the ease with which demonstrations of the full size crusher and power unit were made. Speed set control, based on a built-in, oil-filled hydraulic jack supporting the thrust bearing which holds the crushing head in position, enabled operators to change crusher settings quickly without stopping the crusher. Any desired size within the range of the crusher was obtained even by inexperienced operators, it is said.

New Cement Bag

CALIFORNIA PORTLAND CEMENT CO., Los Angeles, Calif., has been assigned a patent (No. 2,250,980) on a cement bag which automatically reveals whether the contents have come in contact with moisture. The bag is dyed with an acid dye which will cause the bag to change its color if the cement gets in contact with moisture, due to a reaction between alkali present in the cement and the dye.

Cement Storage Contract

CUMBERLAND PORTLAND CEMENT CO., Cowan, Tenn., has awarded The Rust Engineering Co., Birmingham, Ala., a contract to design and build cement storage facilities to cost approximately $50,000. The storage facilities will consist of four concrete silos with a capacity of 45,000 bbl.

Above: Truck which transported crusher and power unit on 15,000-mile demonstration tour. Below: Type "R" crusher in operation at one of the demonstration stops

FINISH THE JOB
WITH A
BAUGHMAN
LIMESTONE SPREADER

Be sure that your production of agricultural limestone is correctly applied. Baughman spreaders will do it. Even distribution of limestone up to 40 ft. width is assured by the spreading action of a specially-designed revolving disc.

The illustration below shows two 7½ ton Baughman MAMMOTH limestone spreaders at work. Notice how the spread is held down to the ground where it belongs and also the width of the spreads. These two machines have spread thousands of tons of lime and are still going strong.

Baughman limestone spreaders are made in models that can be attached to flat or dump trucks. The new, improved MAMMOTH carrier and spreader comes in seven models ranging from 6 to 18 tons. Each model is a self-contained unit with built-in drives and controls.

Write for our literature

BAUGHMAN MANUFACTURING CO.
Specializing in Spreading Equipment
JERSEYVILLE, ILLINOIS

Excavating and Stockpiling
—AT LOWEST COST

Sauerman Scraper handles 100,000-ton storage of crushed rock at cement mill.

Costs but few cents per yard to lift gravel from deep pit with Cableway.

Producers of mineral aggregates all over the world testify to their satisfaction with SAUERMAN Scrapers and Slackline Cableways for problems of digging, conveying and stockpiling.

The first cost of a SAUERMAN machine is reasonable, operation is an easy one-man job, maintenance expense is small.

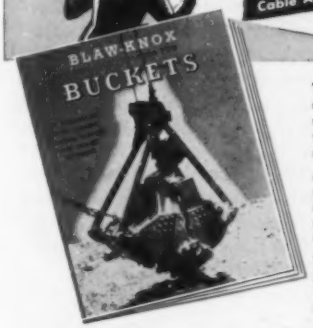
SAUERMAN engineers will be glad to study your stockpiling and excavating problems. Their advice may help you to increase your profits. Investigation costs you nothing.

Write for catalog

SAUERMAN BROS., Inc.
530 S. Clinton St. Chicago

SAUERMAN LONG RANGE MACHINES

You get Operating Advantages in BLAW-KNOX BUCKETS *due to better Structural Features*



The rigid head in Blaw-Knox Buckets preserves fixed cable alignment between upper and lower sheaves, avoiding cable wear caused by loose or wobbly head construction.

All four corner bars are mounted directly on the head pin, thus all impact or pounding action between the head and scoop structure is transmitted directly and not through bolts or rivets.

This and many other exclusive features of Blaw-Knox Buckets are explained and illustrated in CATALOG No 1757. Write for your copy today

BLAW-KNOX DIVISION
of BLAW-KNOX COMPANY
Farmers Bank Building • Pittsburgh, Pa

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BLAW-KNOX *Digging and Rehandling*
BUCKETS

SPEED UP YOUR LOADING WITH THE *Little Giant* . . .

Defense requirements call for speedier methods—start with your loading and save money too, from the efficient operation of The Little Giant Loader. They are designed to efficiently handle 1 to 1½ yards per minute of free flowing materials. Gathering head measures 6' 7" and the swivel spout has a clearance of 8' 6".

We manufacture a complete line of material handling equipment.

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GENERAL CONVEYOR & MFG. CO.
Main Office and Factory
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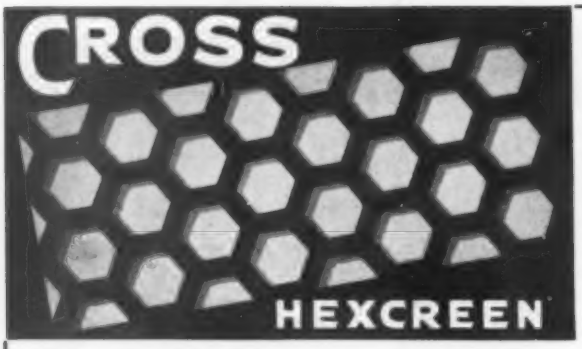

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The Product of Lowest Ultimate Cost

Cross Perforated Steel Sheets and Plates for Vibrating, Shaking and Revolving Equipment.

Vital for American Industry

Vibrating Screen Plate

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★ MANGANESE STEEL CASTINGS ★

for
CRUSHERS
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ROLLS
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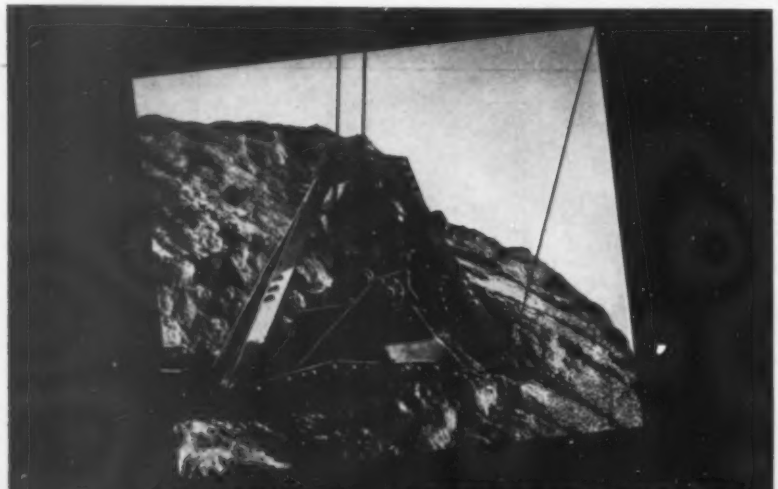
Established 1881 — CARLISLE, PA.



YOU CAN BANK ON A BROWNHOIST BUCKET

Industrial Brownhoist buckets represent the last word in good design and construction. Light weight is combined with unusual strength. Rope wear is reduced to a minimum. Because of the clean, deep bites they take, hand shoveling is practically eliminated. Standard buckets on hand ready for immediate delivery. Write for further facts.

INDUSTRIAL BROWNHOIST

BAY CITY, MICHIGAN • DISTRICT OFFICES: NEW YORK, PHILADELPHIA, CLEVELAND, CHICAGO

OBITUARIES

EDWARD SLADE, who has been interested in both the mining and manufacturing of asbestos for the past 40 years, died on November 22 at the age of 67. He entered the asbestos industry in 1902, in association with W. R. Kerr in the Arthur Murphy asbestos properties in Black Lake. In 1903 he helped to organize the American Asbestos Corporation. He formed the British-Canadian Asbestos Corporation in 1907 which, with his other properties, entered the merger to form the Asbestos Corporation Limited. Mr. Slade later resigned from this company to become chief engineer and sales manager of the Black Lake Consolidated Asbestos Corporation. He entered the manufacturing end of the business in 1921, becoming identified with a company which is now the Marshall-Eclipse Division of the Bendix Aviation Corporation.

•

HARRY HITZEL, formerly general superintendent of the Alpha Portland Cement Co., Easton, Penn., passed away recently after a short illness. He was past 81 years of age, having retired from active service nearly 20 years ago. Mr. Hitzel was born in Germany, having come to America with his parents at the age of 11 years. During his career in the cement industry, in which he spent the greater part of his active adult life, he held patents on a number of manufacturing processes.

•

VICTOR H. KOCH, secretary-treasurer of The Hug Company, Highland, Ill., died recently.

•

EDWARD F. DUX, president and founder of the Edward F. Dux Stone Co., Indianapolis, Ind., died recently at the age of 64.

GILBERT HAMBLEDON TOMPKINS, secretary of Sauerman Bros., Inc., Chicago, Ill., died suddenly at his home, December 2, 1941. He was born at Butler, N. Y., September 29, 1884. Shortly after his graduation from Ripon College, Mr. Tompkins joined the Sauerman organization and was with them continuously from that date. In his 32 years with this company he traveled extensively throughout the country and was well and favorably known in the material producing and construction industries.

•

JOSEPH HARDING, district sales manager of the Standard Slag Co., Youngstown, Ohio, died recently at the age of 62. Mr. Harding had been active in the cement industry for many years. In 1918 he was placed in charge of the Wellston Iron Furnace Co., which bought the Superior cement plant in Lawrence County, Ohio. In 1924 he resigned to go to Buffalo, N. Y., to build the Federal Portland Cement plant, from which he resigned to join the Standard Slag Co.

•

EDWARD LEE HAMPTON, vice president and director of the Cumberland Portland Cement Co., Cowan, Tenn., died recently at the age of 80.

•

W. W. HARMON, engineer, Calaveras Cement Co., San Francisco, Calif., died recently at the age of 68.

•

ALBERT S. HARVEY, president and general manager of U. S. Graphite Co., Saginaw, Mich., died recently at the age of 51. Mr. Harvey worked up to the office of president and general manager in the firm his father, Thomas A. Harvey, helped found and under his leadership it has become one of the largest plants of its kind in the world.

•

EDWIN J. MCGINTY, president of the Kentucky Black Rock Asphalt Co., Chicago, Ill., died recently after an illness of ten weeks.

•

HENRY L. JONES, foreman at the Cleveland Slag Co., Cleveland, Ohio, died recently at the age of 47 after a short illness. Mr. Jones had previously been a bookkeeper for the Cleveland Chain & Manufacturing Co.

•

R. E. HARRISON, salesman for Columbia Portland Cement Co., who lived at Massillon, Ohio, died on November 11, 1941.

•

A. WILBUR NASH, retired treasurer of the old Phoenix Portland Cement Co., died recently.

PULVERIZERS for the reduction of Cement Materials, Limestone, **Agricultural Limestone,** Fire Clay and All Dry, Refractory Materials.

Capacities: 1 to 60 tons per hour — Finenesses: 20 to 350 mesh

BRADLEY PULVERIZER CO.

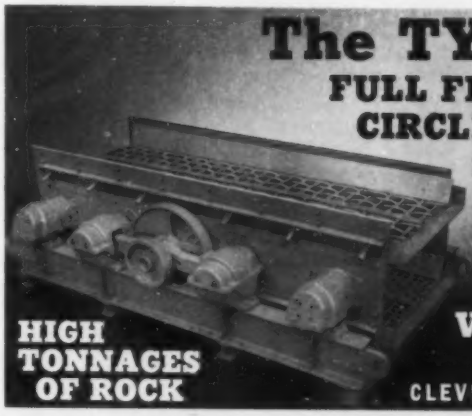
ALLENTOWN, PENNA.

To Increase Capacities or Fineness of Present Grinding Plant—
To Reduce Power and Maintenance Costs—
To Insure an Absolutely Uniform Product—

***Use the* BRADLEY AIR SEPARATOR**

The TY-ROCK
FULL FLOATING CIRCLE THROW SCREEN

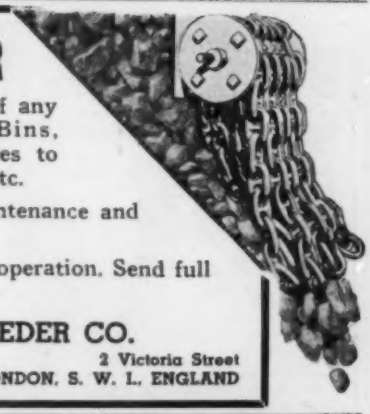
Coarse and Medium Sizes
Live Rubber Mountings
No Escaping Vibration



HIGH TONNAGES OF ROCK

The W. S. Tyler Company
CLEVELAND, OHIO, U. S. A.

THE ROSS FEEDER



Completely controls the flow of any size material from Storage Bins, Hoppers or Open-Dump Chutes to Crushers, Conveyors, Screens, etc.

High in efficiency. Low in maintenance and power consumption.

Furnished in sizes to suit your operation. Send full particulars for recommendation.

ROSS SCREEN & FEEDER CO.

19 Rector Street
NEW YORK, U. S. A.

2 Victoria Street
LONDON, S. W. 1., ENGLAND

THE Leahy HEAVY DUTY

No-Blind VIBRATING SCREEN with TRI-VIBE —for Fine Mesh Screening

All Out Defense Against Blinding

Tri-Vibe Equipped Type C Leahy Screens are the most efficient in fine mesh screening — because open meshes are maintained at greater capacities by Leahy triple-powered vibration.

Leahy HEAVY DUTY Vibrating Screen

Write for Bulletin No. 14-H

THE DEISTER CONCENTRATOR COMPANY
The Original Deister Co., Est. 1906
915 GLASGOW AVE. — FORT WAYNE, IND.

This is NO TIME to Throw Away GOOD STEEL.

Save for Defense

Weld Worn Down or Cracked Manganese Steel Parts with

MANGANAL

Trade Mark Registered U. S. Patent Office

MANGANESE NICKEL STEEL

U. S. PATENTS 1,876,738—1,947,167—2,021,945

WELDING ELECTRODES
APPLICATOR BARS
CAST WEDGE BARS

•

SOLD ONLY THROUGH DISTRIBUTORS

Stulz-Sickles Co.
NEWARK, NEW JERSEY

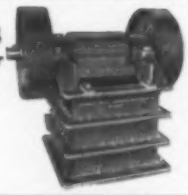
"Established in 1885"

DEPENDABLE

GRUENDLER EQUIPMENT

FREE—Write for Catalog No. 601

JAW CRUSHERS
Bronze or Roller Bearing
Heavy armor plate steel or cast steel.
Heavy Duty Construction
Large capacity
Small power Requirements



For Secondary Crushing
DOUBLE ROLL CRUSHERS
From 18" to 40" Diameter

LIMESTONE PULVERIZERS

Stationary or Portable

Crushes Large Stone to ½" minus Down to Agricultural Dust

Adjustable (8 Sizes)

Cross Section View of Pulverizer

GRUENDLER
CRUSHERS · PULVERIZERS · GRINDERS

GRUENDLER CRUSHER & PULVERIZER CO.
2920-26 N Market St., St. Louis, Mo.

Ready Mix for Defense

(Continued from page 101)

ing entire plants, equipment and personnel to distant locations. This company set up a plant near Wilmington, Ill., to furnish 200,000 cu. yd. of concrete for the construction of the Kankakee and the Elwood ordnance plants. Similar contracts have been carried out by other large established producers. The use of ready mixed concrete has been the means of speeding up construction so that defense projects were completed months ahead of their original schedule.

The trend in ready mixed concrete is toward the installation of equipment and methods which will make possible the attainment of more uniform concrete. C. W. Blakeslee and Sons, New Haven, Conn., has been giving much attention to the achievement of uniformity and was one of the first companies to rebuild its plant and introduce the methods and control equipment of the Scientific Concrete Corporation.

Using Larger Capacity Units

Capacity of truck mixer units has increased to the point where 8- and 10-cu. yd. loads are being delivered. These large units have come into use as a result of demands for heavy deliveries to defense construction projects. There are definite limitations as to their use, however, as city ordinances and state highway laws in many areas would prohibit operation. On this question The Jaeger Machine Co. reports that within the past year a considerable number of 7- and 8-cu. yd. Jaeger truck mixers have entered service in New York City. These large units are not replacing the 5- and 5½-cu. yd. truck mixers in this locality, but are merely serving special projects. There has been a trend to increase payloads on smaller trucks.

The Chain Belt Co. advises that some of their 5½-cu. yd. mixers have been operated as agitator units out of a central mix plant with a rated load of 7 cu. yd., supplying concrete for an ordnance plant.

Concrete Transport Mixer Co. describes the operation of 30 1½-cu. yd. mixers which have supplied 300,000 cu. yd. of concrete for a St. Louis ordnance plant as an example of the use of smaller capacity units on defense jobs. The maximum hourly pour is 140 cu. yd., and the maximum daily pour is about 2700 cu. yd.

All manufacturers report that while an appreciable number of truck mixer units are in capacity ratings over 3 cu. yd., the majority of units in operation and now being purchased are in the 2- to 3-cu. yd. capacities.

New Incorporations

The MacArthur Concrete Pile Corp., with offices in New York, N. Y., and Lansing, Mich., has been incorporated with a capital of 1650 shares of common stock, no par value.

Universal Concrete Pipe Co., a West Virginia corporation, with principal office in Columbus, Ohio, has an authorized capital stock of $30,000. John H. Crosby is agent for the Waco, Texas office.

Roslyn Sand & Gravel Corp., New York, N. Y., has been organized to engage in the sand and gravel business, with a capital stock of 2001 shares, no par value. Jacob I. Goodstein, 21 E. 40th St., New York, N. Y., is the agent.

Brookside Cement Block Corp., Hempstead, N. Y., has been incorporated to deal in cement and concrete products. Capital stock 200 shares, no par value. Agent is Peter S. Bech, 22 Pine St., Freeport, N. Y.

The R. Sierra Granite Co., Inc., Barre, Vt., has been granted a charter with a capital stock of 500 shares with a par value of $100. Incorporators are Robert E. Ruperta and Mabel Sierra, of Barre, Vt.

Cedar River Gravel Co., Kirkland, Wash., has completed incorporation requirements and a charter has been obtained. The new concern is capitalized at $1000. Incorporators are D. O. Smith, E. W. Badcon, and R. J. McIntyre.

Stokes County Mica Co., Raleigh, N. C., with principal office in Marion, N. C., has been granted charter to carry on the business of mining and dealing in mica, etc. Authorized capital stock 1000 shares, no par value, subscribed stock 3 shares. Incorporators are John D. Shaw, Lavynia M. Crosland and Julia McPherson, all of Charlotte, N. C.

Manufacturers' News Notes

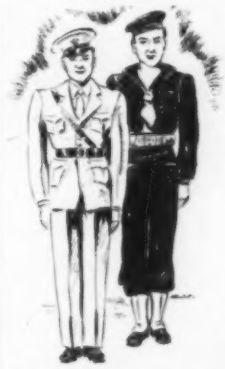
H. B. Fuller Equipment Co., Cleveland, Ohio, has announced the election of George S. Crego as president, succeeding the late H. B. Fuller. Mr. Crego has been associated with the Fuller company in the sale of equipment for the past six years. He was formerly with the Dravo Equipment Co., Pittsburgh, Penn., working out of their Cleveland Branch.

John A. Roebling's Sons Co., Trenton, N. J., has reported the appointment of Eugene King as manager of the Cleveland branch, succeeding Raymond R. Newell who has retired. Mr. King was first employed by the Roebling Co. in 1917 and in 1926 he became salesman in charge of the Detroit area. In 1932 he was moved to 38 counties in northern Ohio, and from 1933 to 1941, he covered the ore loading, dredging, excavating, steel and rubber industries of the Akron district. On July 1, 1941, he was appointed assistant manager of the Cleveland branch, which position he held until his present appointment.

Eugene King

Link-Belt Co., Eastern Stoker Division, announces the removal of its sales offices, effective January 5, 1942, from Philadelphia to the Graybar Building, 420 Lexington Avenue, New York City. K. C. Ellsworth is in charge.

H. K. Porter Co., Inc., Process Equipment Division, Pittsburgh, Pa., announces the appointment of J. H. Hille as Chicago district representative.



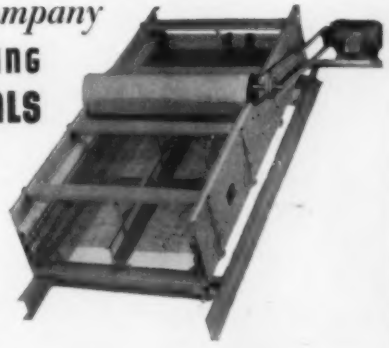
For Both Your Country and Your Company

. . . GET MORE EFFECTIVE SCREENING

Per Dollar Invested with **UNIVERSALS**

The present emergency makes it doubly important for utmost efficiency in your plant—UNIVERSAL SCREENS will assure you of getting just that in meeting exact screening specifications.

Investigate today.



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NAT-ALOY WIRE CLOTH

"Nat-Aloy" Lock Crimp Meshes

Assure Accurate Separations

Abrasive resistant, non-crystallizing. Immediate shipment from stock . . . all widths . . . all meshes . . . attractive prices.

Send for our detailed catalog No. 55.

NATIONAL WIRE CLOTH CO., INC.

252 370 W. FAIRFIELD AVE. — ST. PAUL, MINN.

ROTARY KILNS

GRINDING MACHINERY

for cement, lime, ores, etc.

* * *

F. L. SMIDTH & CO.

60 East 42nd Street New York, N. Y.

You can do more in a "DAY"

Swing Hammer PULVERIZER

Its wide crushing range makes it serve the purpose of two or more other types of crushers. Roller bearing equipped. Write for Bulletin.

Brooks EQUIPMENT & MFG. CO. KNOXVILLE, TENNESSEE

B & W CASTINGS

ELVERITE, for wear resistance

ADAMANTINE, for abrasion-resistance, great strength and machinability

HEAT-RESISTANT CASTINGS

C-45

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET . . . NEW YORK, N. Y.

HAYWARD BUCKETS

WON'T QUIT OR CAUSE TIME OUT

A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.

THE HAYWARD COMPANY

202-204 Church Street

New York, N. Y.

PERFORATED METAL SAND AND GRAVEL SCREENS

Manufactured exactly to your specifications

Any size or style screen, in thickness of steel wanted with any size perforation desired.

We can promptly duplicate your present screens at lowest prices

CHICAGO PERFORATING CO.

2437 West 24th Place

CHICAGO, ILLINOIS

Canal 1459

PYRASTEEL
for high temperatures
SEGMENTAL
KILN ENDS

FOR any diameter of cement kiln . . . . . insures tight sealing, saves fuel, improves burning, reduces production costs. Standard units are easy to handle and simple to install. Segment can be replaced without tearing down ring. *Write for Bulletin.*

Chicago Steel Foundry Company
37th Street at Kedzie Avenue
Chicago, Illinois
Makers of Alloy Steel for 30 Years

TALCOTT BELT FASTENERS

for

CONVEYOR
ELEVATOR &
TRANSMISSION
BELTING

See Our Exhibits

SAND & GRAVEL . . BOOTH G
CRUSHED STONE . BOOTH 57

★

Only a Hammer Needed to Apply Talcott Fasteners

Write for Samples or Information

W.O. & M.W. Talcott, Inc.
91 Sabin St.
PROVIDENCE, R. I.

Manufacturers Notes

Diamond Alkali Co., Madison, Wis., has announced the formation of a subsidiary known as the Diamond Magnesium Co., whose personnel is as follows: Raymond F. Evans, president; Albert H. Ingley, secretary-treasurer; Clifford H. Shie, chief engineer; John H. Montgomery, assistant secretary-treasurer; Julian M. Avery, director of research. The magnesium concern will operate for the U. S. Government the big magnesium plant the government plans to build adjacent to the Diamond plant in Painesville Township.

Chicago Pneumatic Tool Co., New York, N. Y., has announced the promotion of E. R. Goss to branch manager of its El Paso, Texas, office, succeeding E. J. Coughlin, former manager of the branch, who was unfortunately killed in an automobile accident on October 14. J. E. O'Rourke has joined the company's contractors' division staff. A native of Rutland, Vermont, Mr. O'Rourke spent his first business years learning the quarry trade with the Vermont Marble Co., and later the maintenance of machinery and tools with different contractors.

Sauerman Bros., Inc., Chicago, Ill., has announced the removal of its general offices from 438 South Clinton St., to 522 South Clinton St. The new quarters occupy an entire floor and are arranged to provide enlarged facilities for the engineering and order departments as well as an all-around improved layout for other departments of the business.

Kotal Co., New York, N .Y., headed by Howard B. Bishop, has acquired the business of the Asphalt Treatment Corp. The recently organized Kotal Co. manufactures a water-proofing agent for use on aggregates employed in asphalt highway construction and maintenance. Mr. Bishop has developed a number of chemical processes used in industry. At one time he was president of the John C. Wiarda Co., of Brooklyn, which supplied chemicals used in the manufacture of the first aluminum made in the United States. In 1929 the chemical jobbing branch of this firm was sold to a company acquired by American Cyanamid Co. and the manufacturing division was sold to Sterling Products Co., which Mr. Bishop organized in 1908.

Ransome Concrete Machinery Co., Dunellen, N. J., has appointed the McCall Tractor & Equipment Co., Houston, Texas, to handle their complete line of construction equipment in certain sections of Texas.

Stewart-Warner Corp., Chicago, Ill., has announced the election of Joseph C. Elliff and George L. Meyer as vice-presidents. Mr. Elliff was formerly with the Curtis Publishing Co., and for the past two and one-half years was assistant general sales manager of Stewart-Warner Corp. He will continue to serve in this capacity, at the same time assuming new responsibilities. Mr. Meyer, a Stewart-Warner employe since the company was founded, began his career in 1907 with J. K. Stewart, first company president. Since 1939 he has been manager of the Stewart Die Casting Co., a subsidiary. He will continue in charge of the die casting plant in addition to his new duties.

The Timken Roller Bearing Co., Canton, Ohio, has announced the appointment of Dwight A. Bessmer to the position of assistant director of purchases. Mr. Bessmer joined the Timken Co. shortly after his graduation from the Michigan School of Mines in 1929.

Chicago Pneumatic Tool Co., New York, N. Y., has announced the creation of a new office in New York with J. Rogers Davis as "Supervisor of Branches." Mr. Davis' many years experience with a large equipment manufacturer makes him well qualified to fill this new post. An industrial engineer, he also has had broad experience in the preparation of catalogs and sales manuals.

FARREL BACON CRUSHERS

Complete plants designed and equipped, including Screens, Elevators and Conveyors. Machinery for Mines and Rock Quarries, Sand and Gravel Plants.

Engineering Service

EARLE C. BACON, Inc.
17 John St., New York, N. Y.

H & K PERFORATED METAL SCREENS

MAKE YOUR SCREENING SURFACES MORE EFFECTIVE

By having the perforations properly spaced to give greatest capacity and durability. H & K screens are designed to provide largest amount of open area without loss of strength. Any size, any shape, any metal, any perforation.

Send for illustrated catalog.

The Harrington & King Perforating Co.

5650 Fillmore St., Chicago—114 Liberty St., N. Y.

ROCK PRODUCTS

The Industry's Recognized Authority

Keeps you in step with every trend, every development in the Rock Products and Concrete Products Industries. It is edited to fit your exact needs.

ONE YEAR (12 Issues) only $2.00
Or TWO full years for 3.00

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RYERSON CERTIFIED STEELS

10 Strategically-Located Steel-Service Plants

Principal products include—Alloy Steels, Tool Steels, Stainless Steel, Hot Rolled Bars, Hoops and Bands, Beams and Heavy Structurals, Channels, Angles, Tees and Zees, Plates, Sheets, Cold Finished Shafting and Screw Stock, Strip Steel, Flat Wire, Boiler Tubes, Mechanical Tubing, Rivets, Bolts, etc. Write for Stock List. Joseph T. Ryerson & Son, Inc. Plants at Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

Classified Advertisements

POSITIONS WANTED — POSITIONS VACANT Set in six-point type. Minimum $1.00 each insertion, payable in advance.

INFORMATION—Box numbers in care of our office. An advertising inch is measured vertically in one column. Three columns, 30 inches to the page.

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CONSOLIDATED CAN HELP YOU OVERCOME TODAY'S CONDITIONS

GYRATORY CRUSHERS

1—16" Telsmith.
1—18" Traylor Bulldog type.
1—20" Superior McCully.
1—27" Gates, with 100 H.P. A.C. motor.
1—No. 410-TZ Traylor, 10" feed, can be set to ½".
1—2' Symons Cone Crusher, fine bowl.
3—Kennedy No. 19, No. 25, No. 49.
2—Telsmith No. 2-H and No. 3-F.
1—No. 40 Telsmith, 5" feed, ¾" discharge; also No. 40 with 40 H.P. A.C. motor.

JAW CRUSHERS

48"x42" NERMCO; 24"x36" Allis-Chalmers; 9"x36" Wheeling; 15"x36" Universal; 18"x24" Blake, 18"x24" Pioneer; 10"x36" Farrel, and smaller sizes.

VIBRATING SCREENS

1—4'x14' SYMONS, DOUBLE DECK.
2—4'x7' Leahy, 2 deck, motor driven.
4—3'x5' Tyler Hummer, 2 deck, No. 31, enclosed.
2—4'x7' Jeffrey-Traylor, Type FB-4, 2 deck.
1—3'x7' Simplicity, 2 deck, motor driven.
1—3'x8', 3'x10' Niagara, 2 deck.
1—4'x8' Huron, 1 deck, V-belt drive.

2—6' x 12' ROD MILLS

Hardinge straight side Rod Mills, iron lined, Falk herringbone steel gears, Falk enclosed gear drive units, charge of rods with each mill. Arranged for peripheral or trunnion discharge. In excellent condition and for immediate shipment.

COAL PULVERIZERS

2—Erie City "Unitype" Size A, also Size C, with 60 H.P. motor.
4—4'x8' Kennedy; also 3'x6'.
3—Foster Wheeler Size J, with 150 H.P. motors.
2—Riley "Arrow" Size G.
2—No. 55 Raymond "Imp" with 60 H.P. motors.

RAYMOND PULVERIZERS

2—4 roll HIGH SIDE, COMPLETE. Located Toledo. Must be removed by Nov. 10th. Priced accordingly.
3—2 roll HIGH SIDE, COMPLETE. Located Mobile, Ala.
Nos. 0000, 00, 1 and 2, beater type. Also Nos. 55, 60, 90 "Imp" type.

ROTARY KILNS

5'x24', 7'x40', 6'x60', 7'6"x125'.

ROTARY DRYERS, Direct Heat

Ruggles-Coles, double shell: 5'x26', 5'x30', 6'x35', 5'6"x60', 80"x45'.
Single Shell: 5'x30', 6x40, 6x50, 6x60, 7x80.

LIME HYDRATORS

Weber Sr. type, made by Arnold & Weigel with No. 1 Raymond Bros. Lime Separator; also Kritzer. One Complete Hydrated Lime Plant.

BALL, ROD AND TUBE MILLS

Ball Mills, 6x6, 6x8.
Rod Mills: 4'x8', 6x12 Hardinge, straight side.
Tube Mills, 2—5x20' Bonnot Co., silex lined.
1—5x22' Bonnot Co., silex lined.
6'x22', 2—6'6x20' Smidth, silex lined.
5'x22' Allis-Chalmers, 5'x35' Vulcan, both iron lined.

HARDINGE CONICAL MILLS

Silex lined: 4'6x16", 5'x22", 6'x22", 6'x48", 8'x16", 8'x36".
Iron lined: 3'x24", with classifier; 4'6x16", 5'x22", 6'x22", 8'x18", 8'x30", 8'x36" with motor; 8'x48" with air classifier; 8'x48".

CONSOLIDATED PRODUCTS CO., INC.

15-16-17 PARK ROW *Our Shops and Yard at Newark, N. J., cover eight acres.* **NEW YORK, N. Y.**

4 YD. SHOVEL

120B Bucyrus Erie 4 yd. Electric shovel & 100 ft. Boom Dragline.

DIESEL DRAGLINES

2 Yd. Lima Model 750, 60 ft. Boom.
2½ Yd. Bucyrus 48B, 80 ft. Boom.
3 Yd. P. & H. Model 900, 97 ft. Boom.
3—3W Monighan 90 ft. Boom.
4W Monighan, 100 ft. Boom.
5W Monighan, 125 ft. Boom.
6W Monighan, 160 ft. Boom.

DIESEL LOCOMOTIVES

2—43 ton G.E. Std. Ga. Diesel Electric Locomotives.
3—6 ton Davenport Std. Ga. Diesel Electric.

TIDEWATER EQUIPMENT & MCHY. CORP.

305 Madison Ave. New York, N. Y.

FOR SALE

1—4 ft. Standard Symons Cone Crusher with Coarse Bowl—Like New Shop No. 4305.

SUNNYSIDE GRANITE CO., INC.

RICHMOND, VA.

Phone 52891

FOR SALE

1—No. 9 Stearns Joltcrete, about 2½ years old, with molds for 4x8x12 and 4x8x16 hollow blocks, 8x8x16 and 8x12x16 plain, bullnose, corners, halves and solid top blocks.

10,000—8 x 16" Pressed Steel Cored Pallets for 1¼" face shell blocks.....$.25 each

10,000—12 x 16" Pressed Steel Cored Pallets for 1⅝" face shell blocks..... .35 each

3,500—4 x 16" Pressed Steel Cored Pallets for 1" face shell blocks ..... .17 each

500—3 x 16" Pressed Steel Cored Pallets for 1" face shell blocks ..... .10 each

CONCRETE & CINDER BLOCK PRODUCTS CO.

10 Buell Road, Rochester, N. Y.

You can't start work on any kind of a construction job until you have the tools to work with. Neither can one sit idly by waiting for delivery promises to materialize. The solution to the problem is to buy REBUILT and REGUARANTEED equipment and machines from us. WE DELIVER NOW. Here are a few items from our $1,000,000 stock of equipment. Send for our 64 page stock list.

AIR COMPRESSORS

Portable and stationary, belt with elec. or gas power, sizes from 20 cu. ft. to 1,000 cu. ft.

BINS

7—1 150-ton Blaw Knox, 1 115-ton Blaw Knox, 1 72-ton Blaw Knox, 1 51-ton Blaw Knox, 1 35-ton Blaw Knox, 2 30-ton Johnson. Above with or without weigh batchers.
All of the above are 2 comp. bins.

CABLEWAYS

1—Lidgerwood 15 ton cap. cableway, 2300' span, with Lidgerwood 12½x15 steam hoist, with or without steel towers.

CONVEYORS

13—Portable troughing, and flat belt type with cleats, 1—12"x18'6", 1—24"x23', 3—24"x40', 1—14"x25', 1—24"x50', 1—18"x32', 1—24"x30', 1—18"x50'; National, Barber Greene, Stephen Adamson, Portable Machinery and Farquar.

CRANES, DRAGLINES AND SHOVELS

1—Link Belt K-55, ser. No. 1698, 70' boom, 2 yd. bucket, also have a 2 yd. shovel attachment.
1—Link Belt K-48, ser. No. 1728, 60' boom, 2 yd. bucket.
1—Northwest Model No. 5, Serial No. 3572, 50' boom with 1¼ yd. pull shovel attachment.
1—Link-Belt model K-42, ser. No. 1265, 45' boom, 1¼ yd. bucket, also 1 yd. trench hoe att. or 1¼ yd. shovel front.
2—Northwest Model 104, ser. No. 2079, No. 1386, 45' boom, 1¼ yd. bucket; with 1 yd. shovel attachment.
3—Northwest Model No. 4's, Ser. No's. 3441, 3445, 3493, with 40' boom and 1 yd. pull shovel attachments.
2—Northwest model 105, ser. No. 1645, 1522, 40' boom, 1 yd. bucket.
3—Osgood Heavy Duty, ser. No. 2069, 2087 and 2403, 40' boom, 1 yd. bucket and with 1 yd. shovel attachment.
2—Erie gas-air ser. Nos. 4365 and 9758 with 45' boom and 1¼ yd. shovel attachment.
1—Osgood "Commander," ¾ yd., ser. No. 2403, 30' boom and ¾ yd. bucket.
1—Thew ⅝ yd. gasoline shovel with ⅝ yd. shovel front and 40 ft. crane boom. Serial No. 2801.
1—Koehring Model 301, Ser. 544, 40' boom, ⅝ yd. bucket.
1—P&H Model 206, Ser. No. 1901, ⅝ yd., 40' boom.
1—Byers Bearcat Model No. 128, ½ yd. cap., ser. No. 4119 with 30' boom.
1—Byers Bearcat model 27, ser. No. 5289, 30' boom, ½ cl. sw. ½ yd. bucket.
1—Erie Steam Crane, ⅝ yd., 40' boom.

CRUSHERS

7—Jaw Crushers: 1—15x36" Universal; 1—15x36" Cedar Rapids; 1—15x26" Champion; 1—12x20" Acme; 2—10x 20" Climax No. 2½; 1—9x16" Acme.
4—Gyratory Crushers: 1—No. 5 Allis-Chalmers; 1—No. 5 Austin; 1—No. 5 Gates; 1—No. 0 McCully.

PUMPS (DREDGE)

2—10" Morris Dredge pumps, 1 to direct connect to motor, other belt drive.
4—Belt driven: 2 Morris Mang., 1—8", 2—6"; 1—8" Cataract.

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20 Tons Selected Chain and Drives
300' of 8-ply Belt, Water-proofed.

BELT CONVEYORS
12-36" wide H & T Pulleys, 50 sets.
100—18" and 20" Idlers, mounted.
New and Used Rubber Covered Belt.

CRUSHERS
Jaw, 4x10, 7x10, 9x15, 18x12, 20x10, 24x12, 36x24, etc.
Gyratory, No. 3 Gates, No. 11 Traylor & No. 37 Kennedy.
Kent Heavy Duty Mill.
Pennsylvania "Trojan" Hammermill.

VIBRATING SCREENS
1-deck 2x8, 3x5, 3x6, 4x7 and 4x8.
2-deck 3x6, 4x6, 4x7, 4x8.
Hummer 1 & 2-deck 3x5, 4x5, 4x7.
15-cycle Hummer Generator Sets.
5'x20' Revolving, on Trunnions.

CENTRIFUGAL PUMPS
3x2½" A-C type, 250 gals. 150'.
4x4" Rumsey, 400 gals. 80' head.
4x3" 3-stage, 400 gals. 380' head.
8"x6" type, with 25-hp. Motor.

LOCOMOTIVES, CARS, TRACK
36"-g. 4 & 8-ton Gas Locomotives.
36" Side & V-Dump Cars, 2 & 3-yd.
30" Mine Locomotives, 2½-ton cap.
24" Track, Flat & Dump Cars, etc.

MISCELLANEOUS
50-hp. Thomas 2-drum Elec. Hoist.
15-hp. Lidg. 1-drum Gas Hoist.
150-hp. Vertical Boiler, 125 lb.
50-hp. New Loco. Boiler, 200 lb.
15-hp. Cleveland Gear Reducer, 15:1.
Clamshell Buckets ½, ¾, 1¼, 1½-yds.
800-hp. Patterson Feed Heater.
Hoskins Elec. Muffle type Furnace.

G. A. UNVERZAGT, 136 Colt St., Irvington, N.J.

FOR SALE!!

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1—67 ton Porter 6-wheel Saddle tank, A.S.M.E. Boiler, Overhauled.
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2' Symons Cone, Coarse or Fine bowl, fine.
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¾ yard Koehring Gas Crane Dragline with buckets.
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Width	Ply	Top Covers
48"	8	1/8" — 1/16"
42"	5	1/8" — 1/16"
36"	6	1/8" — 1/16"
30"	6	1/8" — 1/16"
30"	5	1/8" — 1/16"
24"	5	1/8" — 1/32"
24"	4	1/8" — 1/32"
20"	5	1/8" — 1/32"
20"	4	1/8" — 1/32"
18"	4	1/8" — 1/32"
16"	4	1/8" — 1/32"
14"	4	1/16" — 1/32"
12"	4	1/16" — 1/32"

TRANSMISSION BELTING
HEAVY-DUTY—FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	3	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

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HEAVY DUTY
RUBBER COVERED

Width	Ply	Top Covers
12"	6	1/16" — 1/16"
14"	6	1/16" — 1/16"
16"	6	1/16" — 1/16"
18"	6	1/16" — 1/16"

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"A" — WIDTH — All Sizes
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Ready-Mix Blaw Knox concrete plant, complete, large size, splendid condition, unusual opportunity, specifications furnished.
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200 ton rock storage bin, steel, heavy construction.
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1½ yd. heavy duty Blaw Knox digging bucket.
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Bucyrus Erie Model 1030 electric tunnel shovel.
2—Marion Diesel shovels, 1—¾ yd. cap.
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Lima Model 101 comb. shovel-crane, 1¼ yds.
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Marion Steam Shovel, 1¾ yd. capacity.
Ind. Brownhoist loco. crane, electric, 20 tons.
Browning loco crane, 25 tons, steam.

LOCOMOTIVES—CARS
2—Vulcan 6 ton, gas, 36" gauge.
2—Whitcomb 4½ ton, gas, standard gauge.
8—3 yd. V type 36" ga. side dump cars.

CRUSHERS
Gyratory crushers: K.V.S. 30, 37-S, 49; Telsmith 32, 5A, 8B; Traylor 8"; McCully 13", 8", 6".
Jaw: 6x12, 9x16, 10x20, 12x26, 13x26, 15x30, 16x32, 36x48, 48x60.
Symons 4' cone crusher, complete.

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400 Barrel Butler Portable Steel Cement Bin with Fuller automatic batcher, push button control.

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36 In. x 20 Ft., 5 Ft. x 30 Ft., 4 Ft. x 30 Ft., 54 In. x 30 Ft., 42 In. x 24 Ft., 5 Ft. x 30 Ft., 5 Ft. x 16 Ft., 5 Ft. x 60 Ft., 6 Ft. x 60 Ft., 6 Ft. x 20 Ft., 6 Ft. x 70 Ft., 10 x 20, 7½ x 100 & 8 x 110 Ft. Kilns.

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GUY: 8 Ton 85 Ft. Boom, 15 Ton 100 Ft. Boom, 20 Ton 115 Ft. Boom, 50 Ton 100 Ft. Boom.
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GASOLINE: 3 Ton, 5 Ton, 8 Ton, 12, 14, and 30 Ton.
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1—24x60 and 1—24x75 all steel with motors and belt.

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1—Brownhoist 15 tons capacity, double drums, 50' boom.

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10—12 yd. capacity all steel 36" gauge air dump cars, air brakes with cast steel side truck frames.
2—4 yd. 36" gauge Koppel all steel rocker dump cars.

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All standard makes, Size No. 4 openings 8x30 up to Size 21 openings 42x134".

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8x16 up to and including 48x60.

SINGLE ROLL CRUSHERS

1—18x24 and 1—21x42 all steel.

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1—Complete crushing plant with 24x36 crusher 3 ft. finishing crusher, vibrator screens, conveyors, steel bins and all electrical equipment.

CRUSHING ROLLS

1—Set Buchanan 14" face, 20" diameter.
1—Set Buchanan all steel, 30" face, 48" diameter.
1—Set Sturtevant 10" face, 21" diameter.

CRUSHER SPECIALS

1—Symons 2' cone crusher, coarse bowl.
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1—Traylor 3' finishing crusher.
1—15x24 Reliance crusher.
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3—Traylor 12" and 16" gyratory.

CRANE OR DRAGLINE

1—Electric full revolving crawler tread crane or dragline 110' boom 3 yd. bucket, 200 H.P. motor generator set, Ward Leonard controls.

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1—8'6"x80' double shell, Ruggles Cole.
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1—Single drum 78" dia., 72" face, with 350 H.P. motor, 2200 volt, complete with all equipment.
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1—3 drum electric hoist with swinger, with steel stiff leg derrick, 75' boom, with or without one yd. clamshell bucket.

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1—Porter 50 ton, 4 wheel, std. gauge saddle tank, air brakes.
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1—Vulcan 21 ton, steam, air brakes, std. gauge.

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NEW —Steel Truck and Wheels, equipped with new pneumatic tires, tongue for tractor hitch, 10-ton capacity, for mounting 40 x 20" rolls or 15" x 36" crusher.
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MILLS: Kennedy Ball 4x6, 5x6 & 5x8. Marcy 8x8 & 10x20. Hardinge 6'x22', 8'x20' & 6'x9'. Misc. Tube Mills 5' & 6' x 22'. Sturtevant Ring Roll, Raymonds, Kents, Fuller-Lehigh, Etc., Etc.
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Miles Tamper and Face Down Block Machine with all attachments and pallets; also 850 45% cast iron Miles Stripper pallets.

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Motors and Generators, A.C. and D.C., for sale at attractive prices. New and Rebuilt. All fully guaranteed. Write for List and Prices.

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- ....Balls (Grinding)
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- ....Batchers (Weighing)
- ....Bearings
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- ....Belting (Conveyor & Elevator)
- ....Bin Level Indicators
- ....Bins (Storage)
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- ....Boats
- ....Brick Machines & Molds
- ....Buckets
- ....Building Tile Machines
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- ....Cement Process
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- ....Concrete Mixers
- ....Concrete Paints & Coatings
- ....Concrete Waterproofing & Dampproofing
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